# JOURNAL

*of the*

## INDIAN MEDICAL ASSOCIATION

VOLUME 25 NUMBER 6 CALCUTTA AUGUST 16, 1955

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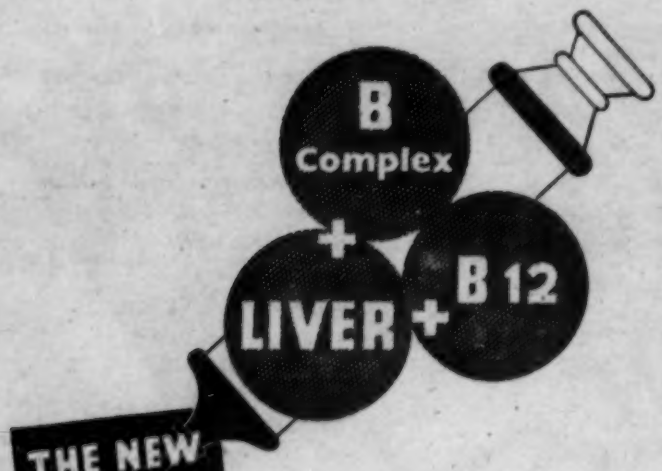


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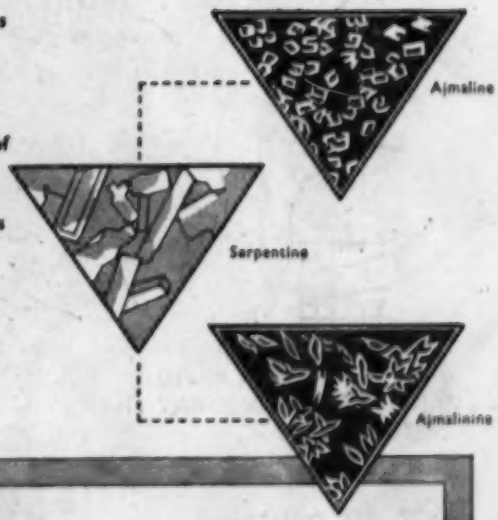


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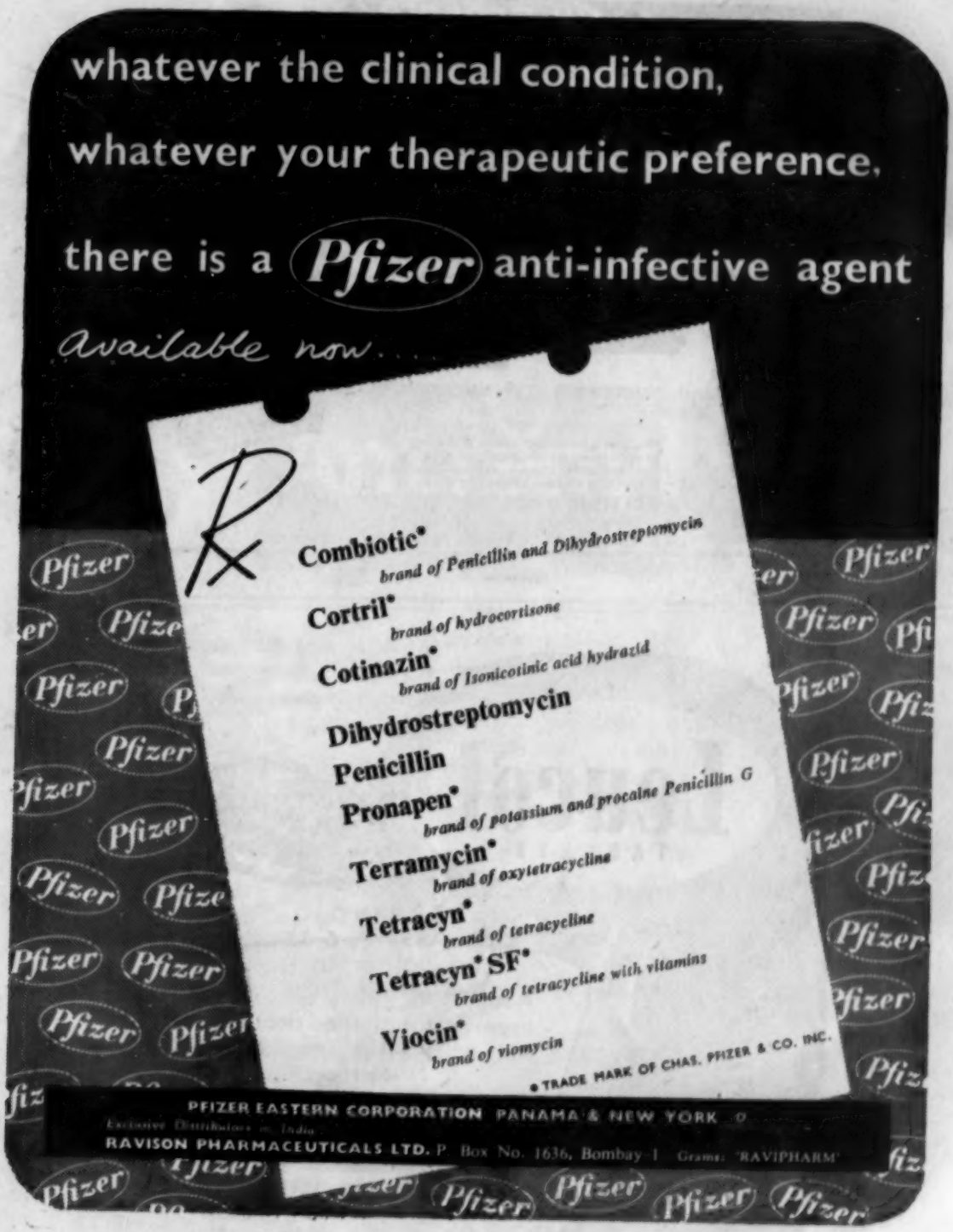
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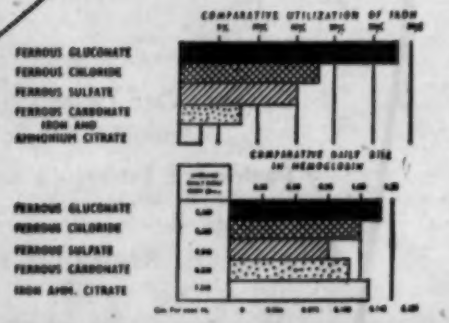


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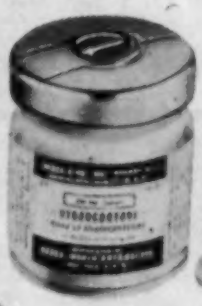

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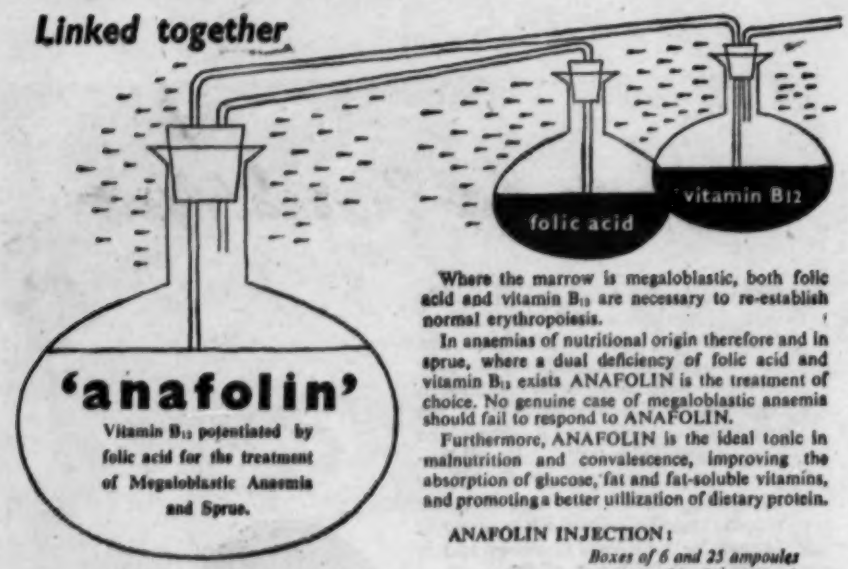


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*ORIGINAL ARTICLES*

# A COMPARATIVE STUDY OF THE ACTIONS OF DESOXYCORTICOSTERONE ON THE GASTRIC SECRETION AND RENAL EXCRETION OF THE WATER AND THE CHLORIDE

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Desoxycorticosterone is known to influence the salt and water metabolism of the body, mainly by diminishing their excretion through the kidneys, thereby increasing the plasma volume and the concentration of $Na^+$ in the body fluid along with retention of the $Cl^-$. The actions of this steroid are not confined to renal tubules alone, as the sweat glands also show a more or less similar response to it as the kidneys. Nothing much, however, seems to be known regarding the actions of the desoxycorticosterone on the other secretory glands of the body. Its actions on the gastric secretion deserve special investigation because $Cl^-$ in the form of HCl forms an important constituent of this secretion, and the plasma chloride, which is the ultimate source of this ion in the gastric juice, is affected by this steroid. In another series of observations on the actions of DOCA on the gastric secretion of 22 healthy human subjects, after a single intramuscular injection of 10 mg. of this steroid in oil, Lahiri (1954) noticed the following effects:

(1) Volumes of both the resting juice and the gastric juice obtained after histamine injection were appreciably decreased, and this diminution was found to be highly significant from the statistical point of view.

(2) Secretion of gastric chloride was also diminished but the decrease was not as marked as in the volume of the gastric secretion.

(3) HCl concentration showed an irregular response, and often varied with the variations in the concentration of $Cl^-$ in the secretory fluid. The latter variation was usually caused by the decrease of the secretions of the fluid and the $Cl^-$ in unequal proportions in response to DOCA.

(4) The effect of one injection continued for at least 96 hours in the majority of the persons and was independent of age or sex.

The above actions of desoxycorticosterone, on the gastric secretion, noted in healthy subjects, were further studied, in comparison with its actions on the kidneys, in a number of patients admitted into the Chittaranjan Hospital and selected for investigation at random. The results are noted below.

## Method and Material

Ten adult persons were subjected to investigation. All of them were having full normal hospital diet with an average intake of 10 g. of NaCl in twentyfour hours. Fluid intake and output (as urine) per 24 hours were carefully measured and recorded from the day previous to the commencement of the investigation in each case, upto the day it was finished. 10 mg. of DOCA in oil was injected intramuscularly, on two successive days, in the morning, in fasting stomach, after the whole amounts of the resting gastric juice and also the juice obtained 30 minutes after the subcutaneous

injection of 0·25 mg. of histamine acid phosphate, were withdrawn. Series of investigations were held, with the collection of the juices in the above way, just before the first injection of DOCA, which served as the control, and then 24 hours after the first injection, 24 hours after the second, i.e. 48 hours after the first injection, and also 96 hours, 7th day and 14th day after the second injection of DOCA. The samples were carefully measured and all of them were analysed, except the last ones, for total $Cl^-$ content and free HCl concentration. Blood pressure was also recorded on these days.

There were 4 females and 6 males in this series. Total gastric chloride was estimated by Volhard's method and expressed as HCl. Urinary and blood chlorides were expressed as NaCl.

### Results of Investigation

*Effect of DOCA on the fluid volume of the gastric secretion*—Volumes of both the resting juice (R.J.) and the juice obtained after histamine injection (H.J.) were found to have significantly decreased. Twentyfour hours after the second dose, R.J. was diminished in 89 per cent and H.J. in all the persons investigated. However, the effect on the R.J. was more sustained than that on the H.J. As is to be expected, the decrease became more marked after the second injection of the steroid than after the first dose, though the latter effect was also quite appreciable in the majority of the persons. The average decrease, 24 hours after the first dose of DOCA was by 26·5 per cent in R.J., and 26·35 per cent in H.J. ; while after 24 hours, 96 hours, 7 days and 14 days, after the second dose, R.J. was diminished by 34·36, 34·34, 43·76 and 49·89 per cent, and H.J. by 37·79, 22·96, 12·19 and 15·69 per cent respectively. The effect lasted till the fourteenth day after the second dose, in R.J. in all the persons, and in H.J. in about 80 per cent of the persons then observed.

Table 1—Effect of DOCA on the Fluid Volume of the Gastric Secretion
(10 mg. DOCA in oil intramuscularly on two successive days)

| Serial No. | Name, Religion, Sex & Age (yrs.) | Just before DOCA | | 24 hrs. after 1st DOCA | | 24 hrs. after 2nd DOCA | | 96 hrs after 2nd DOCA | | 7 days after 2nd DOCA | | 14 days after 2nd DOCA | | Case Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | |
| 1. | A.R., H.F., 25 | 35 | 28 | 28 | 18 | 18 | 20 | — | — | — | — | — | — | Achlorhydria with haematemesis |
| 2. | K.P.R., H.F., 30 | 50 | 49 | 25 | 18 | 26 | 20 | 27 | 21 | — | — | 18 | 20 | Chronic gastritis |
| 3. | S.R., H.F., 35 | 36 | 63 | 27 | 32 | 19 | 38 | 29 | 35 | 23 | 29 | 24 | 35 | Mitral stenosis |
| 4. | M.B., M.F., 27 | 66 | 83 | 35 | 43 | 78 | 41 | — | — | — | — | — | — | Neurosis |
| 5. | K.K., H.M., 40 | 47 | 49 | 31 | 41 | 26 | 28 | 28 | 31 | 28 | 37 | 21 | 48 | Synovitis right knee joint with fever |
| 6. | R.A., M.M., 40 | 62 | 32 | 37 | 35 | 26 | 25 | 25 | 28 | 20 | 39 | 21 | 26 | Gastroenteritis with malaria, convalescence |
| *7. | S.K.G., H.M., 18 | — | 67 | — | 53 | — | 49 | — | 50 | — | 52 | — | 81 | Pyloric obstruction |
| 8. | L.M.D., H.M., 23 | 54 | 71 | 42 | 56 | 24 | 50 | 39 | 32 | 29 | 41 | 37 | 51 | Stricture urethra with urethral fistula |
| 9. | C.K.B., H.M., 58 | 43 | 39 | 40 | 46 | 30 | 22 | 42 | 39 | 28 | 63 | — | — | Gastroenteritis convalescence |
| 10. | R.C.D., H.M., 48 | 42 | 35 | 55 | 38 | 39 | 28 | 32 | 82 | 35 | 54 | — | — | Chronic gastritis |
| | Average | 48·3 | 51·6 | 35·5 | 38 | 31·7 | 32·1 | 31·71 | 39·75 | 27·16 | 45 | 24·2 | 43·5 | |
| | Decrease % | — | — | 26·5 | 26·35 | 34·36 | 37·79 | 34·34 | 22·96 | 43·76 | 12·19 | 49·89 | 15·69 | |

* Used to vomit early in the mornings—so R.J. not measured. Other blank spaces indicate that the patients were either too exhausted or left the hospital.

*N.B.*—Case details in other Tables are the same as in this one.

TABLE 2—EFFECT OF DOCA (IN OIL, INTRAMUSCULARLY) ON GASTRIC CHLORIDE
(Total chloride expressed as HCl in mg. Figures within brackets are the concentrations in gram per 100 c.c.)

| Case No. | Just before DOCA | | 24 hrs. after 1st DOCA | | 24 hrs. after 2nd DOCA | | 96 hrs. after 2nd DOCA | | 7 days after 2nd DOCA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R.J. | H.J. | R.J. | H.J. | R.J. | H.J. | R.J. | H.J. | R.J. | H.J. |
| 1. | 104·30 (0·298%) | 117·32 (0·419%) | 109·48 (0·319%) | 86·40 (0·480%) | 65·34 (0·363%) | 75·00 (0·375%) | — | — | — | — |
| 2. | 195·50 (0·391%) | 220·50 (0·450%) | 101·25 (0·405%) | 77·22 (0·429%) | 112·84 (0·434%) | 90·60 (0·453%) | 76·95 (0·285%) | 85·62 (0·422%) | — | — |
| 3. | 133·92 (0·372%) | 267·12 (0·424%) | 114·48 (0·424%) | 138·88 (0·434%) | 54·15 (0·285%) | 123·50 (0·325%) | 94·25 (0·325%) | 143·15 (0·409%) | 78·43 (0·341%) | 98·89 (0·341%) |
| 4. | 214·50 (0·325%) | 351·92 (0·424%) | 138·95 (0·397%) | 215·00 (0·500%) | 243·36 (0·312%) | 205·00 (0·500%) | — | — | — | — |
| 5. | 160·27 (0·341%) | 176·40 (0·360%) | 119·04 (0·384%) | 162·77 (0·397%) | 96·72 (0·372%) | 111·16 (0·397%) | 104·16 (0·372%) | 130·82 (0·422%) | 104·16 (0·372%) | 142·08 (0·384%) |
| 6. | 238·08 (0·384%) | 127·04 (0·397%) | 137·64 (0·372%) | 134·40 (0·384%) | 80·60 (0·310%) | 93·00 (0·372%) | 93·00 (0·372%) | 114·52 (0·409%) | 44·60 (0·223%) | 140·40 (0·360%) |
| 7. | — (0·316%) | — — | — (0·399%) | 208·20 (0·393%) | — (0·362%) | 192·57 (0·393%) | — (0·384%) | 186·00 (0·372%) | — (0·349%) | 130·00 (0·250%) |
| 8. | 188·46 (0·349% | 301·04 (0·424%) | 131·04 (0·312%) | 244·72 (0·437%) | 83·76 (0·349%) | 181·00 (0·362%) | 170·43 (0·437%) | 119·68 (0·374%) | 108·46 (0·374%) | 189·42 (0·462%) |
| 9. | 147·49 (0·343%) | 131·43 (0·337%) | 64·80 (0·162%) | 97·52 (0·212%) | 56·10 (0·187%) | 33·00 (0·150%) | 183·54 (0·437%) | 165·36 (0·424%) | 119·72 (0·424%) | 315·00 (0·500%) |
| 10. | 115·50 (0·275%) | 165·90 (0·474%) | 240·35 (0·437%) | 213·56 (0·562%) | 180·18 (0·462%) | 150·08 (0·536%) | 135·68 (0·424%) | 434·60 (0·530%) | 157·15 (0·449%) | 255·96 (0·474%) |
| Average | 166·44 | 206·51 | 128·55 | 157·87 | 108·11 | 125·49 | 122·57 | 172·84 | 101·92 | 181·07 |
| Decrease % | — | — | 22·76 | 23·55 | 35·00 | 39·23 | 26·35 | 16·30 | 38·76 | 12·02 |

TABLE 3—EFFECT OF DOCA (IN OIL, INTRAMUSCULARLY) ON GASTRIC FREE HCl.
(Expressed in c.c. of N/10 HCl)

| Case No. | Just before DOCA | | 24 hrs. after 1st DOCA | | 24 hrs. after 2nd DOCA | | 96 hrs. after 2nd DOCA | | 7 days after 2nd DOCA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. | R.J. c.c. | H.J. c.c. |
| 1 ... | 0 | 25 | 0 | 42 | 0 | 5 | — | — | — | — |
| 2 ... | 2 | 39 | 0 | 54 | 23 | 50 | 0 | 25 | — | — |
| 3 ... | 31 | 72 | 14 | 66 | 14 | 62 | 10 | 45 | 32 | 32 |
| 4 ... | 0 | 69 | 44 | 70 | 30 | 84 | — | — | — | — |
| 5 ... | 12 | 23 | 4 | 44 | 21 | 44 | 10 | 42 | 0 | 45 |
| 6 ... | 10 | 10 | 18 | 22 | 0 | 10 | 0 | 33 | 0 | 0 |
| 7 ... | 26 | — | 33 | 37 | 34 | 37 | 27 | 43 | 19 | 23 |
| 8 ... | 33 | 70 | 8 | 74 | 32 | 51 | 52 | 57 | 38 | 77 |
| 9 ... | 4 | 68 | 53 | 45 | 32 | 56 | 48 | 61 | 55 | 92 |
| 10 ... | 20 | 30 | 56 | 105 | 75 | 100 | 39 | 80 | 50 | 58 |

*Effect of DOCA on the total chloride of the gastric secretion*—Total chloride was diminished, in 78 per cent in R.J., and in H.J. in all the persons investigated in this series, 24 hours after the second injection of DOCA. The average decrease of $Cl^-$, 24 hours after the first dose of DOCA was by 22·76 per cent in R.J., and 23·55 per cent in H.J., and 24 hours, 96 hours and 7 days after the second dose, it was by 35·00, 26·35 and 38·76 per cent in R.J., and 39·23, 16·30, and 12·02 per cent in H.J., respectively. This effect lasted at least upto 7 days after the second dose, in 83·33 and 50·00 per cent of the persons, in R.J., and H.J., respectively, then observed.

*Effect on the gastric acidity*—Effect of DOCA on the concentration of the gastric HCl was found to be rather irregular, the same person sometimes showing its increase or decrease on different examinations. These variations were partly related to the variations in the chloride concentration of the juice. The latter variations often occurred due to the fact that though both the water and the chloride secretions decreased under the influence of DOCA, they often diminished in unequal proportions.

*Effect on the volume of urine*—Total volume of urine excreted in 24 hours decreased in 60 per cent of the persons, 24 hours after the second injection of DOCA. Total fluid intake was also simultaneously decreased in some of these cases. Average decrease of the volume of urine, 24 hours after the first dose of DOCA was by 20·17 per cent, and after 24 hours, 96 hours, 7 days and 14 days after the second dose, it was by 17·71, 5·04, 19·29 and 11·52 per cent respectively. The same effect lasted till the fourteenth day after the second dose in 71·4 per cent of the persons then observed.

*Effect on the urinary chloride*—The total urinary chloride was found to have diminished in 70 per cent of the cases 24 hours after the first injection of DOCA, and in 50 per cent of the cases, 24 hours after the second injection of DOCA. The average decrease of chloride 24 hours after the first dose, was by 12·00 per cent and 24 hours and 7 days after the second dose by 11·42 and 3·85 per cent respectively, while 96 hours after the second dose it showed an increase. The decrease of urinary chloride lasted upto 7 days after the second dose of DOCA in only 28·57 per cent of the cases.

TABLE 4—EFFECT OF DOCA (IN OIL INTRAMUSCULARLY) ON WATER INTAKE AND OUTPUT (URINE)

| Case No. | Before DOCA | | 24 hrs. after 1st DOCA | | 24 hrs. after 2nd DOCA | | 96 hrs. after 2nd DOCA | | 7 days after 2nd DOCA | | 14 days after 2nd DOCA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intake c.c. | Output c.c. | Intake c.c. | Output c.c. | Intake c.c. | Output c.c. | Intake c.c. | Output c.c. | Intake c.c. | Output c.c. | Intake c.c. | Output c.c. |
| 1. | 1740 | 1890 | 2010 | 1080 | 1590 | 990 | — | — | — | — | — | — |
| 2. | 2160 | 2400 | 1440 | 1380 | 1500 | 1200 | 1440 | 1200 | — | — | 1320 | 1050 |
| 3. | 2460 | 2400 | 1950 | 1260 | 1950 | 1200 | 2160 | 2040 | 1980 | 1740 | — | — |
| 4. | 1410 | 1200 | 2400 | 1440 | 2520 | 2100 | — | — | — | — | — | — |
| 5. | 1230 | 2640 | 1200 | 2190 | 2940 | 2400 | 3000 | 2550 | 2790 | 2400 | 2700 | 2460 |
| 6. | 1920 | 1620 | 1320 | 900 | 1140 | 600 | 1230 | 720 | 1500 | 600 | 1200 | 780 |
| 7. | 2190 | 960 | 2010 | 600 | 2220 | 660 | 2040 | 780 | 2370 | 600 | 2250 | 2100 |
| 8. | 1710 | 1470 | 2160 | 1680 | 1890 | 1740 | 1740 | 900 | 2070 | 900 | 2250 | 1140 |
| 9. | 1440 | 1260 | 1920 | 1920 | 1800 | 1740 | 1830 | 2220 | 2160 | 1620 | 2280 | 1860 |
| 10. | 1290 | 1260 | 1320 | 1200 | 2100 | 1440 | 1800 | 2580 | 1710 | 1740 | 2070 | 1200 |
| Average | — | 1710 | — | 1365 | — | 1407 | — | 1623·75 | — | 1380 | — | 1512·85 |
| Decrease% | — | — | — | 20·17 | — | 17·71 | — | 5·04 | — | 19·29 | — | 11·52 |

TABLE 5—EFFECT OF DOCA (IN OIL, INTRAMUSCULARLY) ON BLOOD AND URINE CHLORIDES
(Expressed as NaCl)

| Case No. | Before DOCA | | 24 hrs. after 1st DOCA | | 24 hrs. after 2nd DOCA | | 96 hrs. after 2nd DOCA | | 7 days after 2nd DOCA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Whole blood chloride | Urine chloride | Whole blood chloride | Urine chloride | Whole blood chloride | Urine chloride | Whole blood chloride | Urine chloride | Whole blood chloride | Urine chloride |
| 1. | 460 | 6·048 | — | 3·240 | 480 | 8·316 | — | — | — | — |
| 2. | 510 | 14·880 | — | 13·938 | 520 | 5·040 | 500 | 7·920 | — | — |
| 3. | 490 | 9·600 | — | 4·032 | 510 | 3·360 | — | 8·160 | 510 | 12·180 |
| 4. | 500 | 9·840 | — | 4·800 | 510 | 14·280 | — | — | — | — |
| 5. | 480 | 3·960 | — | 8·322 | 480 | 5·280 | — | 10·710 | 470 | 7·440 |
| 6. | 460 | 8·100 | — | 6·300 | 460 | 3·960 | — | 4·032 | 480 | 1·920 |
| 7. | 435 | 2·592 | — | 0·480 | 485 | 0·792 | — | 6·708 | 480 | 3·000 |
| 8. | 460 | 4·557 | — | 3·696 | 490 | 3·828 | — | 6·300 | 490 | 8·004 |
| 9. | 485 | 6·678 | — | 11·904 | 475 | 11·136 | — | 8·436 | 475 | 5·832 |
| 10. | 470 | 3·780 | — | 4·800 | 470 | 6·048 | — | 21·156 | 480 | 9·700 |
| Average | — | 7·0 | — | 6·16 | — | 6·2 | — | 9·17 | — | 6·73 |
| Increase or Decrease % | — | — | — | −12·00 | — | −11·42 | — | +31·0 | — | −3·85 |

*N.B.*—Whole blood chloride is expressed in mg. per 100 c.c. of blood.
Urine chloride indicates total quantity excreted in 24 hours, expressed in gram.

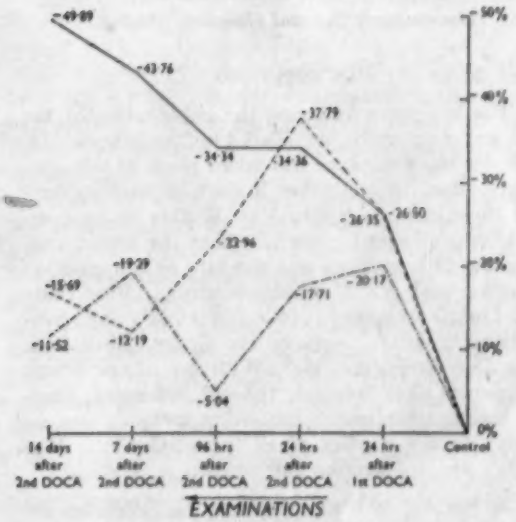


FIG. 1—A COMPARATIVE VIEW OF THE PERCENTAGES OF THE AVERAGE DECREASE IN THE VOLUMES OF R.J., H.J., AND URINE AFTER DOCA.

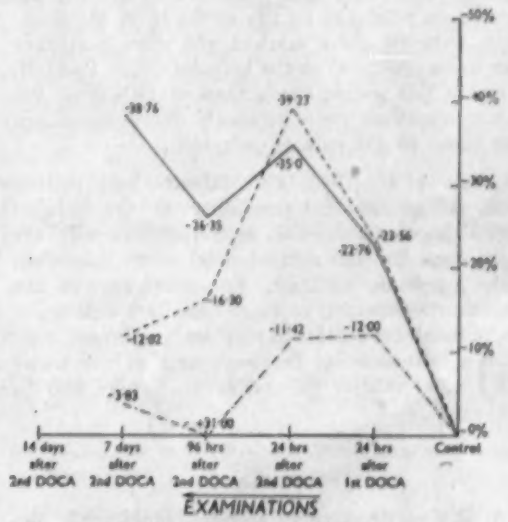


FIG. 2—A COMPARATIVE VIEW OF THE PERCENTAGES OF AVERAGE CHANGES IN THE QUANTITIES OF CHLORIDES OF R.J., H.J., AND URINE AFTER DOCA.

### Discussion

The present series of investigations, of the effect of DOCA on the gastric secretion though observed only on a small number of persons, fully corroborated the previous observations of the same author, that this steroid significantly decreased the volumes of gastric fluid obtained both as the resting juice and also as the juice secreted after the histamine injections, in the majority of the persons investigated. Total gastric chlorides in both the R.J. and the H.J. were also appreciably diminished. The above actions were found to have lasted, in the majority of the persons, upto 14 days in respect of the fluid volume, and upto 7 days in respect of their total $Cl^-$ contents, after the intramuscular injections of 10 mg. of DOCA in oil on two successive days. Unfortunately, the total $Cl^-$ was not investigated in the fourteenth day samples. The gastric free HCl concentration, however, varied irregularly, as was also previously noticed, and it seemed doubtful whether the HCl concentration, was affected at all, by this steroid. The above effects of DOCA were all found to be independent of age or sex, as was also previously recorded by the same author. A comparative study of the actions of this steroid on the secretions of both the gastric glands and the kidneys, showed that though the effects manifested were similar in nature in both these organs as regards the decrease of the volumes of the secreted fluids and their total $Cl^-$ contents, yet the actions produced on the stomach, in these respects, were far more marked and more persistent than those produced on the kidneys (Figs. 1 and 2). Thus, in this series, the actions of DOCA on the gastric secretion were decidedly more significant than those on the urinary secretion.

Addis *et al* (1918) and Silvette and Britton (1938) suggested the possibility of the adrenocortical hormonic control, in conjunction with the hypophysis, for the normal renal water secretion. With the same analogy, the possibility of the desoxycorticosterone, or more broadly speaking, of the mineralocorticoids having an important controlling influence on the secretions of the water and the chloride of the gastric juice may also be considered.

### Summary

Desoxycorticosterone acetate significantly decreased the volumes of the gastric secretion obtained both as the resting juice and also as the juice secreted after the histamine injection, as also their total chloride contents. The above effects were decidedly more marked than the similar effects of this steroid on the volumes and the $Cl^-$ content of the urine, in the majority of the persons investigated. The above facts point to the possibility of desoxycorticosterone, or more broadly speaking, of the mineralocorticoids having a controlling influence on the secretion of the water and the chloride of the gastric juice.

### Acknowledgment

My best thanks are due to Messrs. Ciba Pharma Ltd., for supplying free of cost all the DOCA in oil, used in this study. I am also grateful to the Clinical Laboratory Ltd., of Calcutta and their biochemist Mr. P. K. Roy, for carrying out all the biochemical investigations.

### References

Addis, T., Shevky, A. B. and Bevier, G.—*Am. J. Physiol.*, **46** : 129, 1918.

Lahiri, S. C.—*J. Indian M. A.*, **23** : 142, 1954.

Silvette, H. and Britton, S. W.—*Science*, **88** : 150, 1938.

## CHLORPROMAZINE HYDROCHLORIDE IN ANAESTHESIA

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### Introduction

The ten years following the culmination of the last war may aptly be called the 'anaesthesia' decade for more advance has taken place in this speciality, than in any other branch of science, during this period. A Rip Van Winkle waking up in 1955 is sure to be bewildered at the astonishing progress of anesthesia and the rate of introduction of newer and newer anaesthetic drugs. First came the muscle relaxants, followed closely by antihistaminic drugs, hypotensive drugs, phenothiazine derivatives, etc. etc. With the newer drugs, techniques also changed, the old fashioned, time-consuming, unpleasant inhalation methods surrendering to the needles of all types—Gordh's, Mitchell's etc. to mention but a few.

In France, in 1952, what may be called 'anaesthesia without anaesthetic drugs' was introduced when certain antihistaminic drugs and phenothiazine derivatives were found to be of great value in anaesthesia, by Laborit (1952) and Laborit and

Huguenard (1952). Ungar *et al* (1937) had already shown that certain drugs like benzodioxane not only antagonised adrenaline but also histamine and later Bovet *et al* (1944) produced more potent drugs which were not only antihistaminic but also strongly sympatholytic. Experimental work on the side actions of antihistaminic drugs by Dews and Graham (1946) and several others in the continent revealed that antihistaminic drugs had many properties including those of local anaesthetic drugs. The attempts to produce more potent antihistaminic drugs than promethazine in France resulted in the discovery of chlorpromazine hydrochloride. Laborit and Huguenard (*loc. cit.*) introduced chlorpromazine in anaesthesia in 1951.

## Pharmacology

Chlorpromazine hydrochloride was first introduced in France and subsequently in England. Chemically, it is a phenothiazine derivative, a hydrochloride of 3-chloro-10(3-dimethylamino-n-propyl)phenothiazine. Structurally, it closely resembles promethazine although it has feeble antihistamine action. It is soluble in water and aqueous solutions are highly acidic. A precipitate is formed when mixed with thiobarbiturate solutions and it is inadvisable to mix with other solutions also except pethidine and morphia. When necessary to inject in intravenous drip glucose-saline, it should be injected as high as possible so that it may be well diluted to prevent damage to endothelium of vessels. Intramuscular injections, although painful, are safe. It is well absorbed even by the oral route.

*Elimination*—Marked destruction occurs in the body and a small fraction is eliminated in the urine very slowly. The most prominent effects are on the central nervous system and autonomic nervous system.

*Effect on central nervous system*—It is a central depressant inhibiting the activity of entire central nervous system. Depressant activity is manifest even peripherally. This depressant effect is evidenced as hypnotic, anticonvulsant, antipyretic and hypothermic and by its action of enhancement of the action of anaesthetic and analgesic drugs. Failure of conditioned reflex responses, inhibition of tone of all kinds of muscles and potentiation of action of curariform drugs have also been described. Electroencephalogram reports are similar to those under physiological sleep. Probably it interferes with cellular activity of brain tissue by interfering with dehydrogenase activity.

*Effect on autonomic nervous system*—It is a strong sympatholytic (adrenolytic as well as l-noradrenolytic) and a mild parasympatholytic drug. In this respect it differs from diethazine which is a stronger parasympatholytic. It is a powerful, centrally acting anti-emetic and arrests even vomiting induced by drugs.

In this article, observations on the use of chlorpromazine in anaesthesia in 55 cases for major surgery have been described. The object of study was to find out its use for the following purposes:

(1) Premedication before anaesthesia; (2) post-operative sedation; (3) prevention and treatment of hyperpyrexia; (4) potentiation of general anaesthesia; (5) postponement of operative shock; (6) as an anti-emetic); (7) for producing hypothermia; (8) reduction of postoperative morbidity; and (9) producing hypotension during operations.

The investigations were first begun with a study on the effects on unanaesthetised subjects. Both oral and intravenous routes were employed and the subjects included some well educated patients, medical students and doctors, including the writer. The results are shown in Table 1.

## Premedication

It was noted that the minimum dose required for an adult for appreciable effect was either 150 mg. by oral route or about 50 mg. intravenously. In all cases, there were no after-effects during recovery. For intravenous route, the drug was mixed up in 25 c.c. of normal glucose saline and injected slowly. Next, it was tried along with pethidine or promethazine or with both. It was noted that approximately 50 mg. promethazine reduced the dose of chlorpromazine required by 25 mg. Combination with pethidine made it pleasanter for the patient. It was also noted that addition of 25 mg. of promethazine and 50 mg. of pethidine to a slightly smaller dose of chlorpromazine helped to achieve longer duration of action. Pethidine also helped to lower pulse rate. We found the following dose satisfactory for premedication:

| | | |
|---|---|---|
| Oral—3 hours before ... | Chlorpromazine | 75 mg. |
| | Promethazine | 50 ,, |
| | Pethidine | 50 ,, |
| or | | |
| Intravenously 20 minutes to ½ hour before | Chlorpromazine | 50 mg. |
| | Pethidine | 50 ,, |
| or | | |
| Intramuscularly 45 minutes before | Chlorpromazine | 75 mg. |
| | Pethidine | 50 ,, |

The above mentioned premedication was employed in 79 cases and out of these chlorpromazine was combined in 55 cases for potentiation of general or regional anaesthesia and for the remaining 24 chlorpromazine was stopped with the pre-

TABLE 1—EFFECT OF ORAL AND INTRAVENOUS ADMINISTRATION OF CHLORPROMAZINE ALONE IN UNANAESTHETISED SUBJECTS.

| Dosage | 25 mg. | 50 mg. | 75 mg. | 100 mg. | 150 mg. |
|---|---|---|---|---|---|
| Oral route | No action | No appreciable action. | Disinclination to work, desire to lie down, thirst. Effect lasted 3 or 4 hours. | Drowsiness, apathy, calm, skin dry and warm, pallor, motor weakness, ptosis, severe thirst. | Sleepy to unconcious, skin dry and warm, extreme motor weakness, pulse rapid, low tension. Patient appearing unconscious but can be roused. Fall of B.P. (lying horizontal) varying from 20 to 40 systolic. Effect lasted 4 to 6 hours. |
| Intravenous | Drowsy, complaint of pain in chest, palpitation, thirst, tired feeling. Effect lasted 20-30 minutes. | Sleepy, apathetic, skin dry and warm, pallor, rapid pulse, fall of B.P. 10-30 systolic. Effect lasted 45 minutes to 1 hour. | Unconsciousness, pallor, pulse markedly rapid and feeble, appreciable fall of B.P. Effect lasted about 2 hours. | ... | ... |

medication dose. Chlorpromazine appeared to be an ideal drug for premedication. The patients were not only sleepy but also less apprehensive, co-operative and thoroughly dry, just like after a full dose of atropine. Induction of general anaesthesia was facilitated, smooth with absence of breath holding and laryngospasm. No case vomited and there were no complications attributed to this premedication. The incidental fall of blood pressure was helpful to the surgeon and the tachycardia caused by the premedication always settled down after starting the anaesthesia. It was also found that the pulse rate could be brought down by repeating another small dose of chlorpromazine with pethidine. After this premedication, the patients must be in bed lying down. Chlorpromazine satisfied all the requirements of premedication and can safely replace the opiate-atropine combination.

### POSTOPERATIVE SEDATION

Chlorpromazine has both advantages and disadvantages when administered in post-operative period.

*Advantages*—1. It marked a state of well being in patients. They were quiet, calm and restful.

2. Free from vomiting or even nausea.

3. Chlorpromazine has an antipyretic effect and prevents hyperpyrexia.

*Disadvantages*—1. It created a state of amnesia with disturbing dreams in a few, especially in the older group.

2. The patients appeared apathetic, pale and dry with lack of interest in surroundings which was often mistaken for a state of shock by the junior staff.

3. A state of hypotension continued which once again misled the nursing staff.

4. The suppression of cough and the respiratory depression led to chest complications, especially in the older group. Two of the eleven cases in our series, to whom this drug was administered post-operatively, developed severe lung complications.

Except to prevent vomiting or hyperpyrexia, this drug was found unsuitable for post-operative sedation.

### POTENTIATION OF ANAESTHESIA

Table 2 shows the cases for which chlorpromazine was tried for potentiation of anaesthesia and the results.

TABLE 2—SHOWING THE CASES FOR WHICH CHLORPROMAZINE WAS TRIED FOR POTENTIATION OF ANAESTHESIA AND THE RESULTS.

| Operation | Anaesthesia | No. of cases | Result | Death | Remarks |
|---|---|---|---|---|---|
| Thyrotoxicosis ... | General $N_2O+O_2$ | 11 | Unsuccessful only in one case, which had to be postponed due to pulse rate of 160 (120 to begin with) after the anaesthesia but before the incision. | — | Very good results in 3 cases, which were severely toxic and did not have thiouracil. |
| Radical mastectomy | General | 9 | Good in all | — | — |
| Nephrectomy (for hypernephrosis) | ,, | 2 | ,, | — | — |
| Cholecystectomy ... | ,, | 2 | ,, | — | — |
| Lobectomy for bronchiectasis | ,, | 1 | Indefinite | 1 | Death due to shock on the next day. |
| Decortication ... | ,, | 1 | Good | — | — |
| Oesophagotomy ... | ,, | 2 | ,, | 2 | 1 died due to peripheral failure on the third day and the other on the 8th day. Cause? |
| Injury lung lobectomy | ,, | 1 | Very good | — | — |
| Gastrectomy ... ... | ,, | 5 | Good | — | — |
| ,, ... ... | Spinal | 5 | ,, | — | — |
| ,, ... ... | Local | 7 | Very good | — | — |
| Tumour brain ... ... | General | 2 | Fair | — | Delayed recovery. |
| Heniocolectomy ... | ,, | 2 | Good | — | — |
| Laminectomy for spinal cord tumour | General | 1 | Good | — | — |
| Block dissection of cervical glands | ,, | 2 | ,, | — | — |
| Perineal excision of rectum | ,, | 1 | — | — | — |
| Abo-perineal excision of rectum | ,, | 1 | — | — | — |
| | | — | | — | |
| | Total | 55 | Poor result in 1 | 3 | |

Chlorpromazine was found to be a very useful adjuvant not only in general anaesthesia, but also in spinal and local anaesthesia. It potentiates all anaesthetic drugs including thiopentone sodium, muscle relaxants and analgesic drugs.

(a) It potentiates the action of thiopentone sodium to a very great extent and hence great caution is necessary while administering thiopentone after chlorpromazine premedication. We were able to manage cases like suprapubic cystotomy, cystoscopies etc. under less than 0·5 gr. of thiopentone sodium alone after chlorpromazine premedication.

(b) Chlorpromazine reduces the concentration of ether or trilene required to a very great extent. Cases like radical mastectomy and thyroidectomies where much muscle relaxation is not required, could be well managed under nitrous oxide and oxygen alone with chlorpromazine. However, cases undergoing abdominal surgery required almost the usual dose of relaxants. Although the quantity of relaxants required was not cut down, relaxants seem to act for longer periods. Since operative shock as well as shock of anaesthesia seem to be minimal under this technique, it appears to be ideal for major geriatric surgery. In our series 29 cases of over 50 age group were done under this technique without any complication. We also found this technique ideal for radical surgery for malignancy.

### Anaesthesia

*Technique adopted—*

Premedication :

| | | | |
|---|---|---|---|
| Chlorpromazine | .. | 50 mg. | I.M. about 1 hour before |
| Promethazine | .. | 50 mg. | |
| Pethidine | .. | 50 mg. | |

In a few cases promethazine was omitted and no appreciable change was noticed. Into 540 c.c. of normal saline and glucose, 75 mg. of chlorpromazine and 100 mg. of pethidine hydrochloride was added and the solution was started as an intravenous drip about 20 minutes before the anaesthesia. At first the solution was run in at about 90 drops a minute. Later it was slowed down to about 40 drops a minute when the patient appeared deeply asleep. Usually about 150 to 200 c.c. of the solution is required. Anaesthesia is started at this stage with intravenous thiopentone 2½ per cent solution and after 200 to 250 mg. a Waters' airway or Guedel airway is put in and anaesthesia is continued with nitrous oxide/oxygen, in the proportion of 66⅔ and 33⅓ mixture. Nitrous oxide is gradually cut down to 50 per cent after operation is started. The drip is stopped if the anaesthesia is sufficiently deep. It was found that for operations like radical mastectomy, thyroidectomy, etc. where much relaxation was not required, this depth of anaesthesia was quite sufficient and required no more of anaesthetic drugs, except nitrous oxide and oxygen.

For endotracheal intubation a minimum of 30 mg. of succinylcholine chloride or 40 mg. of gallamine were found necessary. All abdominal operations lasting about 2 hours required on an average 20 mg. of curare or about 160 mg. of gallamine.

Very few patients required to be supplemented with trilene or ether.

*Case 1*—Mrs. S., Anglo-Indian, aged 50, came for radical mastectomy for carcinoma of the breast with good general condition and B.P. 130/90 mm. Hg. After the above mentioned premedication, 200 mg. of intravenous thiopentone and about 200 c.c. of potentiating solution, under nitrous oxide and oxygen 50 per cent, operation was started. Within five minutes after starting the operation, B.P. fell to 80/50 and the operation was continued after stopping the drip. The patient remained sufficiently anaesthetised for the rest of the operation under nitrous oxide and oxygen only and maintained the B.P. at the same level, though the pulse rate gradually increased to 130. The patient recovered from the anaesthetic 4 hours after the end of operation, but the blood pressure was restored to normal only the next day. The post-operative period was absolutely smooth.

*Case 2*—Mrs. G., Hindu, aged 54, came for radical mastectomy for advanced carcinoma of the breast with poor general condition and B.P. 90/50 mm. Hg., pulse rate 90 per minute and Hb. 60 per cent. She too was anaesthetised as above and inspite of her poor general condition, she stood the operation well. The blood pressure remained steady at 70/50 throughout the operation and the post-operative period was remarkably smooth. Only 350 c.c. of blood was transfused during the operation.

It was observed during other operations, that under the influence of chlorpromazine, pulse rate and blood pressure remained steady during the whole operation, probably because of autonomic blockade. Because of this observation, this technique was employed in thyroidectomies for thyrotoxicosis, which included three severely toxic cases. Excepting one case (Case 4) which had to be postponed because of tachycardia, it was noted that chlorpromazine kept even severely thyrotoxic cases fully under control throughout the operation and in the post-operative period so long as the patient was under the effect of chlorpromazine. Initially there was a rise in pulse rate which was brought down later by the general anaesthesia. The surgeons were also happy because of diminished bleeding due to orthostatic hypotension.

Another advantage was that the delayed recovery was helpful in affording rest to the patient. Except nitrous oxide and small dose of thiopentone, no other anaesthetic drug was necessary. Post-operatively, the patients were comfortable. In our series of 11 cases only 3 cases received blood transfusions.

*Case 3*—Mrs. L., aged 45, with B.M.R. +35 and marked exophthalmos and with a history of having auricular fibrillation one month ago. She was operated on under the technique described above and the total quantity of chlorpromazine administered was 95 mg. Initially the pulse rate rose to 132 but remained steady at 110-120 throughout the operation. Blood pressure also was fairly stable.

*Case 4*—Woman aged 26, was resistant to thiouracil and very toxic with resting pulse rate 128 per minute and B.M.R. +30 as per Read's formula. She was put under sedation from the previous night when she had 1½ gr. of phenobarbitone. On the morning of operation, at 7 A.M. as usual, she was given omnopon 1/3 gr. subcutaneously. Then she had 50 mg. of chlorpromazine intramuscularly at 9 A.M. and the potentiating drip solution was started at 9-30 A.M. After starting the anaesthesia, with 150 mg. of intravenous thiopentone and nitrous oxide and oxygen, the pulse rate was 100. Waiting for 15 minutes did not lower the pulse rate and she was postponed. Two months later she was equally toxic and this time she was given basal avertin and nitrous oxide/oxygen with trace of ether. During the operation she had to be given intravenous Lugol's iodine twice. During the early part of the operation she was difficult to manage, but towards the end, pulse settled down to 90. Post-operative period was uneventful. The observation in this case is that chlorpromazine failed, where other drugs had also failed.

### Chlorpromazine and Spinal Anaesthesia

Chlorpromazine was found to be a very useful adjunct to spinal anaesthesia for upper abdominal surgery in depressing the parasympathetic responses like retching, vomiting, etc. during the operation. The fall of blood pressure, however, was greater and the patient needed greater care on the table.

### Chlorpromazine and Local Anaesthesia

No other use of chlorpromazine is more helpful than to supplement the shortcomings of even good local block. In 7 cases chlorpromazine was tried as an adjunct to intercostal block for gastrectomy and gastro-enterostomy. Splanchnic block was not done and the patients tolerated pull on the stomach without any sign of discomfort. The chlorpromazine premedication made even the block painless. We now routinely employ chlorpromazine as premedication before laparotomies under local block with great success. Mixtures of chlorpromazine with diethazine hydrochloride have even greater effect, but the disadvantage of this combination is the tachycardia.

### Chlorpromazine and Shock

As already mentioned, chlorpromazine postpones shock, probably because of autonomic blockade. This was especially noted in radical operations for malignant diseases and promises to be of great use in radical surgery.

### Chlorpromazine and Hypothermia

Chlorpromazine is an antipyretic and prevents hyperpyrexia so common in postoperative period. Cooling of the surroundings, facilitates the action of chlorpromazine. In a series of 4 cases temperature was promptly lowered by chlorpromazine.

### Chlorpromazine Hypotension

Chlorpromazine, by itself, lowers the blood pressure and the fall of blood pressure can be exaggerated by reverse Trendelenburg position. Hypotensive drugs can also be used along with chlorpromazine. Procaine-amide also helps to lower the blood pressure under chlorpromazine.

It is worth experimenting whether chlorpromazine can prevent cardiac arrhythmias and ventricular fibrillation that are likely to occur during anaesthesia. We failed to notice any effect of chlorpromazine on cardiac arrhythmias under cyclopropane.

After chlorpromazine premedication, controlled respiration technique should be carefully employed. We observed that return to spontaneous breathing was very much delayed.

### Discussion

An important requirement of a drug employed for premedication is that it should not produce vomiting. Unfortunately all drugs which depress central nervous system stimulate the vomiting centre and the two properties seem to go together. Hence for a long time search has been going on to find a drug which while depressing the central nervous system would not produce vomiting. Various synthetic morphine substitutes like methorphinan, the amidones and pethidine all failed to suppress vomiting. Chlorpromazine now seems to satisfy this requirement. It suppresses even vomiting induced by centrally acting emetics. In the 70 cases reported in this paper, vomiting was significantly absent in all cases.

The management of a severely thyrotoxic patient during thyroidectomy sometimes proves a difficult problem. The fluctuations of the blood

pressure and pulse rate remain uncontrollable. Avertin on which strong faith was once held has gradually lost its use for this purpose. The prevention of thyroid crisis is also equally important. We observed that with this chlorpromazine potentiating solution, oxygen could be increased to 40 per cent, limiting nitrous oxide to 60 per cent yet not making the patient too light in anaesthesia and chlorpromazine, besides potentiating showed some property of stabilising the cardiovascular system, preventing rapid fluctuations. Though the pulse rate, was sometimes high, the patients appeared quite well and comfortable immediately after the operation, and the post-operative period was smooth. In the three severely toxic cases described, post-operative thyroid crisis was anticipated but these cases also had a smooth post-operative period. On the operation table these cases were put in about 150° to 20° reversed Trendelenburg tilt and fair degree of orthostatic hypotension was secured. Avertin, though a good basal anaesthetic for thyrotoxic patients, is a powerful respiratory depressant and often the patient's respiration continues to be depressed even after the operation, requiring oxygen administration and greater post-operative nursing care. On the other hand, chlorpromazine offers good sedation for nearly 3 to 4 hours after operation, but not with respiratory depression.

The control of retching, vomiting and hiccups during gastrectomy or cholycystectomy under spinal or local anaesthesia is a great problem even to the experienced anesthetist. Hiccups occur sometimes even when controlled respiration is performed for the upper abdominal operations. The best way of overcoming this is of course the splanchnic block. Posterior splanchnic block is not always satisfactory. Anterior splanchnic block has to be done by the surgeon himself. Alternatively deep general anaesthesia also controls these reflexes, but at the expense of other complications. We observed that a drip of this potentiating solution and also chlorpromazine premedication suppressed these reflexes to a very great tolerable extent, making both splanchnic block and general anaesthesia unnecessary.


### Summary

1. Observations on the use of chlorpromazine for premedication in 24 cases showed that chlorpromazine was an ideal drug for premedication.
2. Chlorpromazine by potentiating anaesthetic drugs, makes anaesthesia for major operations safer and simpler.
3. Post-operative morbidity after potentiation of anaesthesia by chlorpromazine was considerably less.
4. Chlorpromazine makes local anaesthesia more comfortable for the patient.
5. The value of chlorpromazine in thyroid surgery has been described.
6. Chlorpromazine is a good anti-emetic.


### References


BOVET, D., HORCHOIS, R. AND WALTHERT, P.—*Compt. rend. Soc. Biol., Paris*, **138** : 99, 1944.

DEWS, P. B. AND GRAHAM, J. D. P.—*Brit. J. Pharmacol*, **1** : 278, 1946.

LABORIT, H.—*Presse. Med.*, **60** : 120, 1952.

LABORIT, H. AND HUGUENARD, P.—*Ibid*, **60** : 1455, 1952.

UNGAR, G., PARROT, J. L. AND BOVET, D.—*Compt. rend. Soc. Biol.*, **124** : 425, 1937.


## ON THE PRESENCE OF HISTAMINE IN CULTURE MEDIA


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Histamine is a potent biochemical substance present in nearly all tissues of the body. In tissues it occurs in loose combination with protein from which it readily separates on hydrolysis or putrefaction. It is closely related to histidine an amino acid present both in tissues and bacteria from which it is easily derived. It is not known for certain that the histamine is present in the bacterial body as in the tissues, but there is a great presumption of its presence for some obscure purpose.

Bacteria require nitrogenous food material, and in case of pathogenic organisms this generally consists of protein and protein derivatives like peptone, serum, egg protein and others. These substances, as is known, do not contain free histamine but certain group of organisms like coliforms produce histamine from protein or protein derivatives. The effects of histamine thus liberated on the bacteria is not known but the presence of histamine is evident in practically all infections by pathogenic organisms. During infections the presence of histamine may be due to tissue reaction, tissue damage and allergic manifestations.

### Material and Methods

In the following experiments, biological method of detection of histamine was used, the test object being guinea-pig ileum. The method proposed by Schild (1947) and as described by Reuse

(1948) has been adopted here for identification of histamine.

After the guinea-pig was killed by a blow on the head an empty piece of gut was removed. The gut was kept in Tyrode's solution from which a small piece of less than one inch was suspended in a bath continuously aerated from a pressure pump. The Tyrode's solution was prepared in the following way: 40 ml. of solution I and 20 ml. each of solution II and III to be made up to 1000 ml. by adding distilled water. *Solution I*: sodium chloride 200g., potassium chloride 5g., calcium chloride 10g., magnesium chloride 5g., was dissolved in distilled water and volume made up to 1000 ml. *Solution II*: sodium dihydrogen phosphate 1·25 g. was dissolved in distilled water and volume made up to 500 ml. *Solution III*: Sodium bicarbonate 25g. was dissolved in distilled water and volume made up to 500 ml.

In all experiments the Tyrode's solution contained atropine sulphate in the concentration of 1 μg. per ml. The various substances were matched against a standard solution of histamine acid phosphate containing 1 μg. per ml. in normal saline calculated as histamine base. This solution was freshly made from a stock solution containing 100 μg. per ml. in normal saline calculated as histamine base.

Soluble substances were tested by dissolving them in normal saline. The insoluble ones were first extracted by alcoholic extraction procedures as described by Schmiterlow (1949). After extraction the samples were dissolved in distilled water and neutralised with decinormal sodium hydroxide solution using neutral red as indicator and then tested.

## Results

### Experiments with peptone and nutrient broth:

*Peptone was tested in three different forms for the presence of histamine as given:*

(1) A fresh solution of 1 per cent peptone in normal saline.

(2) Peptone water as is used in bacteriological laboratory which is an autoclaved solution of 1 per cent peptone in 0·5 per cent sodium chloride solution. Again different samples of peptone water were tested such as a fresh solution autoclaved at 5, 15, and 20 pounds pressure for half an hour and sterile samples from stock prepared a few weeks before.

(3) Alkaline peptone water as is used in bacteriological laboratory which is peptone water of approximate pH 8·4. Here again two samples were tested such as a freshly prepared solution and sterile samples from stock prepared a few weeks before.

The sterile stock sample of peptone water showed marked gut stimulating property (Fig. 1)

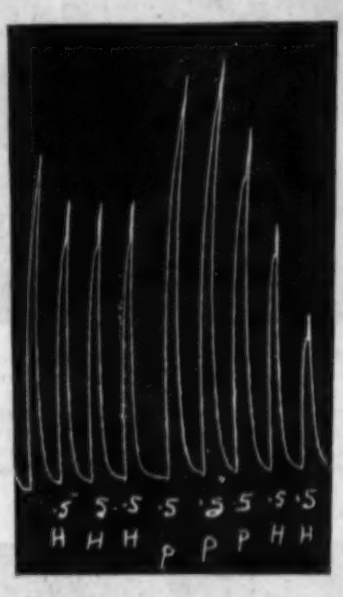


Fig. 1—Showing Effect of Stock Peptone Water on Isolated Gut. At Mark 'H' Histamine 0·6 μg. and at Mark 'P' 0·5 ml. of Stock Peptone Water Added.

and the effect was spontaneous. This gut stimulating effect was antagonised by mepyramine maleate. These sterile samples had also changed to a deeper colour than the fresh ones though there was no evidence of any contamination. All other samples of peptone solution did not show any gut stimulating property (Fig. 2).

*Nutrient broth*—It was meat broth containing 1 to 2 per cent peptone and 0·5 per cent sodium chloride. The nutrient broth both fresh and stock samples showed marked gut stimulating property which was antagonised by mepyramine maleate. Since this effect for the above reasons could not be due to peptone content hence autoclaved meat extract was tested which showed similar activity which could be antagonised by mepyramine maleate (Fig. 3).

### Experiments with nutrient agar, blood agar and loffler's serum media:

2 g. from each medium was extracted as mentioned before, and the dry extract was dissolved

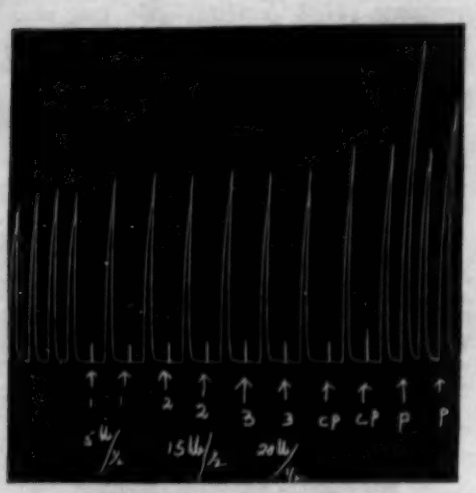

FIG. 2—SHOWING THE EFFECT OF 1 PER CENT PEPTONE SOLUTION AUTOCLEVED AT 5, 15, AND 20 LB. PRESSURE FOR 30 MINUTES MARKED AS 1, 2 AND 3 RESPECTIVELY. IT ALSO SHOWS THE EFFECT OF ALKALINE PEPTONE WATER (CP) AND STOCK PEPTONE WATER (P). INTERVENING CURVES SHOW THE EFFECT OF 0·5 μG. OF HISTAMINE ON ISOLATED GUT.

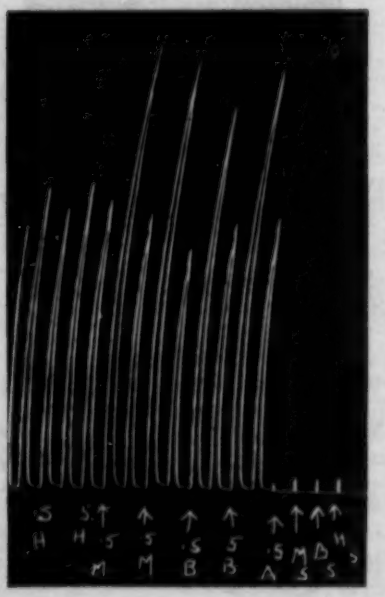

FIG. 3—SHAWING THE EFFECT OF 0·5 ML. EACH OF MEAT EXTRACT (M) AND NUTRIENT BROTH (B) ON ISOLATED GUT. INTERVENING CURVES SHOW THE EFFECT OR 0·5μG. OF HISTAMINE. IT ALSO SHOWS THEIR ANTAGONISM WITH MEPYRAMINE MALEATE (A) 0·5 ML. OF 0·5 μG. PER ML. STRENGTH.

in 2 ml. of distilled water and neutralised before testing. Of these three media the nutrient agar alone showed gut stimulating property which was antagonised by mepyramine maleate (Fig. 4).

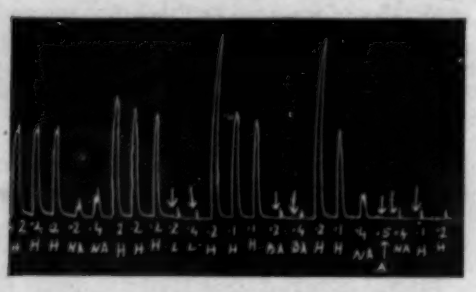

FIG. 4—SHOWING THE EFFECT OF THE EXTRACT OF NUTRIENT AGAR (NA), LOFFLER'S SERUM (L) AND BLOOD AGAR (BA) ON ISOLATED GUT. INTERVENING CURVES SHOW THE EFFECT OF DIFFERENT QUANTITIES OF HISTAMINE (H) OF 1 μG. PER ML. STRENGTH. IT ALSO SHOWS THE ANTAGONISM OF NUTRIENT AGAR BY MEPYRAMINE MALEATE (A) 0·5 ML. OF 0·5 μG. PER ML. STRENGTH.

EXPERIMENTS WITH A FEW PATHOGENIC ORGANISMS TO FIND EVIDENCE FOR THE PRESENCE OF HISTAMINE IN BACTERIAL BODY:

From a 24 hours' culture of bacterium coli, staphylococcus and bacillus of Friedlander on nutrient agar tube scrapings were taken and extracted as mentioned before. The dry extract was dissolved in 1 ml. of distilled water and neutralised before testing. Of all these three organisms tested the bacillus of Friedlander only showed feeble gut stimulating activity (Fig. 5).

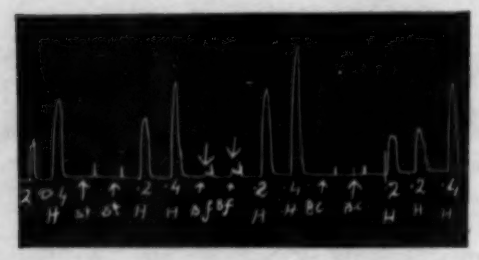

FIG. 5—SHOWING THE EFFECT OF THE EXTRACT OF STAPHYLOCOCCUS (St.), BACILLUS OF FRIEDLANDER (Bf) AND BACILLUS COLI (Bc) ON ISOLATED GUT. INTERVENING CURVES SHOW THE EFFECT OF DIFFERENT QUANTITIES OF HISTAMINE (H) OF 1 μG. PER ML. STRENGTH. THE INVERTED ARROW MARK SHOWS THE SMALL CONTRACTION PRODUCED BY THE EXTRACT OF FRIEDLANDER'S BACILLI.

Its antagonism with mepyramine maleate, however, could not be done because of the small quantity.

EFFECT OF HISTAMINE AND MEPYRAMINE MALEATE ON GROWTH OF C. DIPHTHERIAE AND FRIEDLANDER'S PNEUMOBACILLUS :

The above mentioned substances were added in concentrations of about 5, 25, 50 and 100 μg. in Loffler's slopes and to these measured amounts of the above organisms were inoculated, the control containing no such substance. It was then incubated at body temperature for 24 hours. On the basis of the naked eye examination of the culture media after 24 hours, it seems in general that these substances in the given concentrations do not affect the growth to any appreciable extent.

## Discussion

The detection of histamine by biological methods and their identification by antagonistic test is not specific. A strong presumption, however, can be made. In this article therefore, such effects were considered to be due to histamine.

Peptone does not seem to contain histamine in quantities detectable by biological methods and the appearance of histamine in sterile stock peptone solution cannot easily be accounted for although such peptone solutions do not differ in their usefulness from a fresh preparation for which they are used. Alkaline peptone water on the other hand, either stock or fresh samples do not show any gut stimulating property. It has been shown that whereas histamine is preserved in acid medium, it is destroyed in alkaline medium. The negative results obtained with alkaline peptone, therefore, may be due to this action. This media is sometimes used for cultivation of vibrio and the raised pH apart from alkalinity, eliminates at least a gut stimulating factor, presumably histamine, from the medium either when present or when formed.

Nutrient broth invariably contains histamine and the source is obviously meat extract. Histamine is uniformly present both in fresh and stock samples. It is interesting to note that broth is commonly used as medium for growth of organisms as well as in preparations of simple solid media. Of the solid media tested for the presence of histamine only nutrient agar showed positive results though broth is used in the preparation of both nutrient agar and Loffler's medium. The histamine contained in broth seems to be preserved in nutrient agar and not in Loffler's medium.

On the question of the presence or absence of histamine in bacterial body, legitimate conclusion would be from the experiments embodied in this article that there is every likelihood for its presence. To prove conclusively it needs large quantity of bacteria and many more different organisms. Again histamine and antihistaminics do not seem to have any influence on the growth of few organisms tested and judged only by naked eye examination. Further investigations are being made to elucidate the action of histamine on bacteria, if there be any.

### Acknowledgments

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### References

Reuse, J. J.—*Brit. J. Pharmacol.*, **3** : 174, 1948.
Schild, H. O.—*Ibid*, **2** : 189, 1947.
Schmiterlow, C. G.—*Acta. Physiol. Scand.*, **19** : 260, 1940.

*REFRESHER COURSE*

# ANTIBIOTICS

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The phenomenon of antibiosis was first noted in 1877 by Pasteur and his colleagues who found that certain air-borne, organisms inhibited the growth of the anthrax bacillus. In 1929, Fleming working on staphylococci found that a contamination caused the lysis of the staphylococcal colonies on the culture plate. This was identified as a mould named *Penicillium notatum*. Since then a large number of newer antibiotics have been developed, penicillin being the first member of this group. Antibiotics are divided into four main groups :

1. Antibiotic agents of bacterial origin (spore and non-spore forms) ;
2. Antibiotic agents derived from moulds and fungi ;
3. Antibiotic agents derived from actinomycetes ; and
4. Antibiotic agents of non-bacterial origin.

## Penicillin

Penicillins so far isolated are penicillin F, G, X and K. Penicillin G is most predominantly in use.

Free penicillin exists as a dibasic organic acid and forms salts and esters. When exposed to air or heat it loses activity. It is also unstable in the presence of acids, alkalies, alcohols, oxidising agents and heavy metals.

Sodium and calcium salts are largely in use. Methyl, ethyl and benzyl esters of penicillin have been prepared. These may not be destroyed by the gastric juice and have the advantage of being administered by mouth.

*Absorption, distribution and excretion*—When given by intramuscular, subcutaneous or intravenous injection, penicillin is readily absorbed and diffuse well into most of the body tissues and fluids. A rapid concentration is obtained in blood from where it also disappears quickly. Normally little or no penicillin is absorbed from the stomach partly because it is inactivated by the HCl, and partly by the enzyme 'penicillinase' produced by the intestinal flora. Recently however very large doses by mouth have been shown to produce effective serum levels. Potassium salts give higher and more sustained concentrations than sodium or other salts. Better results may be obtained by simultaneous administration of some antacid.

The rapidity with which penicillin is absorbed and excreted necessitates the frequency of injections or a continuous infusion in order to maintain a constant concentration in the tissues. This difficulty has been overcome by the long-acting or depository penicillins like penicillin in oil or beeswax, procaine penicillin and penicillin with aluminium stearates.

Penicillin diffuses through almost all tissues of the body, with the exception of the central nervous system and bone marrow, at least in same concentration after systemic administration. Penicillin is rapidly excreted by the kidneys. 50-60 per cent of the penicillin administered by a single I.V. injection is excreted in the urine within one hour. In cases of renal disease or urinary suppression the excretion is delayed and high concentration is maintained in blood.

*Mode of action*—Penicillin can act as a bacteriostatic as well as a bactericidal agent. It is believed that penicillin interferes with some vital function of early bacterial development, and it is most effective when active multiplication of bacteria is taking place. The penicillin activity is not affected by the number of bacteria present in contrast to sulphonamides. While 99 per cent of the sensitive bacteria are destroyed by penicillin a few remain unaffected and are called 'persisters'. It is suggested that these organisms are dormant and in a non-dividing phase. When they resume normal division they become susceptible to penicillin. Resistance to penicillin has also been noted, but it does not always account for a poor therapeutic response.

*Toxic effects*—Stinging pain is sometimes produced at the site of injection. Different brands of penicillin vary in their tendency to produce this pain. Potassium salts produce more pain than the sodium salts. The pain may pass off immediately after injection or a dull pain may remain for 24 hours.

Venous irritation at the site of injection may occur in 5-10 per cent of cases.

Fever and chillis may also occur in 5-10 per cent of cases due to the presence of pyrogens.

Urticaria, erythema and some other allergic reactions may occur after penicillin injection due to some antigenic properties possessed by crystalline penicillins. Urticaria when it occurs, can be controlled with adrenaline and calcium.

Headache, flushing of face, nausea, vomiting or diarrhoea sometimes occur after penicillin administration. Colicky pain in the abdomen and muscle pains have also been occasionally met with.

Therapeutic shock or Herxheimer's reaction occurs after penicillin administration in the treatment of syphilis. Symptoms subside within 24-48 hours.

Penicillin when given intrathecally may produce direct irritation of the central nervous system and this property is attributed to penicillin itself rather than to its impurities.

All the toxic or side reactions mentioned above are easily controlled and none of these endanger life. But lately some cases of immediate death after an intramuscular injection of procaine penicillin have been reported. The possible cause may be that a small amount of procaine penicillin might have leaked into a vein causing immediate death.

*Mode of administration* (1) Local—In infected wounds penicillin can be used locally. Both sodium and calcium salts can be used but the latter is better. A solution containing 1,000 I.U. per c.c. can be instilled into the wounds. Injection into an abscess cavity gives good results. If pus is too viscid, it becomes liquefied after 2 or 3 days of penicillin therapy. Local sprays and wet dressings are useful for surface lesions. Penicillin cream or ointments can be used locally in the treatment of superficial wounds, burns, sycosis barbae, impetigo, etc. Local treatment in the form of sprays or inhalations is used in severe lung conditions. Lamellae are used for eye conditions and lozenges for infection of mouth and throat. Dental cones are also available for tooth extraction.

(2) Subcutaneous route—This is not generally used.

(3) Intravenous route—For routine practice this method is not suitable.

(4) Intramuscular route—Penicillin can be given both by intermittent method or by continuous drip. In the former 30,000 units of penicillin dissolved in 2 c.c. of normal saline or distilled water has to be repeated every 3 hours. In more severe cases the dose may be increased. The object of I.M. drip is to avoid repeated injections. The method is quite satisfactory but the procedure is quite a cumbrous one. Penicillin in oil or beeswax and other repository-type penicillins like procaine penicillin, have overcome this difficulty by prolonging the action of the drug in the body. But a high concentration in blood is not obtained rapidly, and the presence of foreign matter like beeswax or oil or aluminium monostearate, etc. may produce toxic reactions. For this purpose preparations like 'procaine penicillin G' buffered with crystalline penicillin are available by which a rapid high blood concentration is obtained and lower but effective concentration is maintained for the next 20-24 hours. Procaine penicillin G with 2 per cent aluminium monostearate (P.A.M.) is a highly stable compound, is slowly absorbed, and there is economy of dosage and prolonged therapeutic blood levels up to 48 hours and occasionally for 3 days. This preparation is very effective in the treatment of syphilis. Similarly an ester of penicillin named 'Dibenzylethylenediamine dipenicillin' has also the same effect and the concentration is maintained for 4-5 days after a single injection —longer than any other long-acting penicillin so far, and yet the foreign matter is avoided. Moreover, it can also be administered by mouth with full therapeutic effect.

(5) Intrathoracic and intrathecal administration—In empyema and other effusions penicillin can be introduced into the pleural cavity directly along with systemic administration. Similarly it can be given intrathecally also as its diffusion into the cerebrospinal fluid is slow after systemic administration.

*Penicillin in therapeutics*—Septic wounds, osteomyelitis, abscesses, carbuncles, acute and chronic recurrent tonsillitis, sinusitis, acute and chronic pharyngitis, quinsy, etc., are amenable to treatment with penicillin. Both local and systemic administration are necessary.

Lung conditions like lobar pneumonia, broncho-pneumonia ; acute and chronic bronchitis, are all susceptible to penicillin therapy.

Genito-urinary infections, puerperal sepsis, gonococcal urethritis and arthritis, syphilis in all stages, yaws and leptospirosis are all amenable to systemic administration.

Generalised blood infections such as acute and subacute bacterial endocarditis, septicaemias etc. respond well to massive systemic doses.

Prophylactically penicillin is used in all minor and major operations where there is chance of sepsis. In cases of serious septic conditions, e.g., carbuncles, abscesses, etc., an effective penicillin barrier may be established by injecting round the focus.

Susceptible organisms may become resistant to penicillin during treatment. In such cases it should be combined with sulphonamides or newer antibiotics like streptomycin or bacitracin which act synergistically.

### Streptomycin

Streptomycin was discovered by Waksman in 1944 from a ray fungus *Streptomyces griseus* isolated from the soil.

*Absorption, excretion and distribution*—High concentrations in blood are obtained immediately after an intravenous injection, about one hour later after an intramuscular injection and still later after a subcutaneous injection.

Streptomycin is excreted mainly by the kidneys by glomerular filtration, but more slowly than penicillin. It is also excreted in bile, faeces and sputum. It does not diffuse through the tissues as readily as penicillin and low levels are found in liver and spleen and none in the brain. In blood its concentration is much higher in plasma than in the corpuscles.

*Mode of administration*: (1) Subcutaneous route—0·5 g. in 1-5 c.c. of normal saline or distilled water can be given every 4 hours or at larger intervals.

(2) Intravenous route—This does not possess any advantage and is not commonly used.

(3) Intramuscular route—This is the most satisfactory route of administration and is the method of choice and the same technique as for penicillin is advised. Due to slower rate of excretion it is not necessary to administer the drug more frequently than once or twice in 24 hours. The entire daily dose of streptomycin (1 g.) can be given by a single injection without affecting the therapeutic response.

(4) Intrathecal administration—0·1 - 0·5 g. may be dissolved in 5-10 c.c. of normal saline and can be introduced directly into the cerebrospinal fluid in cases of tuberculous meningitis, etc., along with systemic therapy.

*Toxic effects*—In larger doses streptomycin produces toxic effects frequently. Minor reactions

like flushing of face, nausea, vomiting, headache, etc., are due to allergic reactions. Local irritation at the site of injection is common. Irritation of the renal tract though common, yet serious damage leading to anuria occurs with very high dosage only when kidney damage is already present.

Sensitisation reactions like fever, skin erruptions of erythematous, urticarial or maculopapular type are met with sometimes. These are relieved by antihistamine drugs. Most of the rashes appear from the 3rd to the 10th day of treatment. The most serious toxic effect of streptomycin with larger doses for prolonged periods is an impairment of vestibular function. With smaller doses only a temporary dysfunction may result. Deafness is however rare. Paraesthesias are sometimes produced but are usually mild and transitory. Psychosis may occasionally be met with.

*Therapeutic uses*—In general streptomycin is indicated in infections caused by sensitive Gram-negative and acid-fast bacteria. Perhaps its greatest value is in the management of various forms of tuberculosis. But its usefulness in other infections is equally great. Among these are urinary infections specially due to *E. coli, Proteus vulgaris,* and brucellosis. Before the advent of streptomycin, bubonic and pneumonic plague used to be fatal, but now these are effectively treated with streptomycin.

With prolonged streptomycin therapy there is a tendency of development of resistant strains of bacteria and there is the problem of toxicity. Introduction of daily dihydrostreptomycin has reduced the toxicity to a degree but the problem still remains. These difficulties may be reduced to some extent by properly regulating the dosage and duration of therapy. The dosage varies according to the diagnosis and clinical condition of the patient. The trend is towards smaller doses than were given formerly. In early days doses of 1-3 g. daily were administrated for 2-6 months in cases of tuberculosis. Now it is known that many cases respond well to a dose of 0·5 g. daily for 6 weeks, alternatively 2 g. doses may be given at intervals of 2-5 days for 3-4 months along with preparations like para-aminosalicylic acid and isonicotinic acid hydrazide, both these drugs acting as coadjuvants to the action of streptomycin. With this combination the development of the resistant strains of tubercle bacilli is also effectively checked. PAS and INH both have an inhibiting action on the tubercle bacilli and they tend to succumb sooner than when either drug is used singly.

Streptomycin is not a cure for all cases of tuberculosis but it is usually a very useful adjunct when used with already established methods of treatment including rest and surgery.

### Chloramphenicol

In 1947 Ehrlich and his associates reported a new antibiotic substance 'chloramphenicol' from a soil actinomycetes. It is a pure crystalline substance and has been obtained from the cultures of a species identified as ***Streptomyces venezuelae,*** It has also been prepared synthetically.

*Administration, dosage and toxic effects*—Chloramphenicol is well absorbed after oral administration and this is the route of choice. Intravenous route may be employed, but it is rarely necessary.

Dosage varies with the type of infection, but is generally 50-60 mg. per kilogram body weight initially followed by 0·2-0·3 g. every 2 to 4 hours or at longer intervals, according to the clinical condition of the patient. Length of treatment also varies in different infections. Relapse may occur after the use of smaller doses.

*Therapeutic indications*—It is used in typhus fevers and complete recovery occurs with the recommended dose of 60 mg. per kg. body weight initially, followed by 0·25 g. every 3 hours for several days or until the temperature falls to normal.

In typhoid fever chloramphenicol therapy is specific. The temperature begins to fall within 24-48 hours and returns to normal in 3-4 days. Symptoms begin to improve generally and patients feel comfortable after 24 hours. 0·25 g. every 4 hours is given until the temperature comes down to normal, after which 0·25 g. may be given every 6 to 8 hours for another 5 or 6 days.

Toxic symptoms are noted in nearly half of the cases and include nausea, vomiting, diarrhoea, distension, retention of urine, delirium, convulsions, etc. Rashes or stomatitis may also be encountered.

In infections of the urinary tract, caused by *E. coli, Aerobacter aerogenes,* and pseudomonas group, chloramphenicol therapy has been found to respond favourably.

### Aureomycin (Chlortetracycline)

Aureomycin is an antibiotic derived from a strain of *streptomyces aureofaciens.* It was discovered by Duggar in 1948. It is faintly golden yellow in colour. If kept in dry powder form in sealed capsules, it retains its potency for at least 7 months at room temperature.

*Absorption and excretion*—After oral administration, aureomycin is rapidly absorbed from the gastro-intestinal tract. This is the route of choice.

It is very rapidly excreted in the urine and the excretion continues for 2-3 days after a single dose of 0·5 to 0·75 g.

*Toxic symptoms*—In therapeutic doses, the drug is well tolerated and is relatively non-toxic for practical purposes. During large doses the commonest complaint is looseness of bowels with frequent and bulky stools, but actual diarrhoea is uncommon. Nausea and vomiting occasionally occur. Aureomycin when injected intramuscularly is moderately irritating. Topical application of aureomycin in the form of ophthalmic ointment containing the hydrochloride salt is also irritating.

*Therapeutic indications*—Intermittent treatment with aureomycin may be more desirable as it may permit the regrowth of some surviving organisms which then in a more active metabolic state are more sensitive to the action of aureomycin, but the intervals between doses should not be long enough as to nullify the beneficial effect of the preceding doses.

Aureomycin can be used with success in many diseases like acute brucellosis, infections of the haemolytic *staphylococcus aureus* group, chronic urinary tract infections due to *E. coli, B. paracolon*, or *streptococcus faecalis*. Gonorrhoeal urethritis, acute pneumococcal pneumonia, acute meningococcaemia, lymphogranuloma venereum.

Direct application of aureomycin borate alone or supplemented by systemic therapy with the hydrochloride has been effective in various types of conjunctivitis and other ocular infections.

A common current recommendation for oral dosage is as follows:

25-50 mg. per kg. per day for penemococcal infections, 50-100 mg. per kg. per day for rickettsial infections, 300-500 mg. per kg. per day for salmonella infections given in divided doses every 4 hours during the first 24 hours and then every 6 hours.

*In vitro*, however, a curious antagonistic action of aureomycin and penicillin and aureomycin and streptomycin has been reported. It is not known whether similar effect is obtained *in vivo* also but the problem warrants study.

## Oxytetracycline

Oxytetracycline was isolated from soil actinomycetes. *Streptomyces rimosus* in 1950 by Finlay and his coworkers. It is a golden yellow crystalline amphoteric compound forming both hydrochloride and sodium salts, which are very stable. It is one of the broad-spectrum antibiotics and is active against a wide variety of organisms (both Gram-positive and Gram-negative). It is also active against Rickettsiae and some viruses.

*Absorption, excretion and toxicity*—It is administered largely in capsule form by the oral route. In some patients relatively larger doses may cause nausea, vomiting and sometimes diarrhoea, but it is not sufficiently severe to necessitate discontinuation of the drug and can be easily controlled by giving the capsules with cold milk rather than with water. Proctitis, vaginitis and pruritis, usually of mild degree, are occasional reactions. Possessing a low order of toxicity it can be given in larger doses without fear of toxic effects.

It is readily absorbed from the gastro-intestinal tract and is readily excreted in urine and faeces.

*Dosage*—Crystalline oxytetracycline hydrochloride is available in capsules of 50, 100 and 250 mg. as the free base. For children, an elixir or syrup is also available. Oral dosage varies from 1 to 5 g. daily given in 3-4 divided doses. In most of diseases 1-2 g. daily is quite adequate.

The drug is also available in combination with sodium glycinate for intravenous use for patients too ill to take the drug by mouth.

*Clinical use*—Pneumococcal pneumonia responds well, the temperature generally falling to normal within 48 hours. A dose of 1-2 g. daily is satisfactory in most cases.

In gonorrhoea its use has given satisfactory results. Percentage cure rates in clinical trials in males have ranged from 91·7 to 98 per cent. One gram given in two 0·5 g. doses at 6-hour intervals is sufficient to cure 98 per cent of the patients with acute infections. In refractory cases the dose may be increased and continued for 2-3 days.

Oxytetracycline is being increasingly used in surgical infections. It is of great help and an adjunct to surgical treatment of septic and suppurative peritonitis.

It is effective against many urinary infections like *A. aerogenes, E. coli, P. vulgaris, P. aeruginosa* and the recommended dosage is 0·5 g. every 6 hours. It is also effective against *Shigella dysenteriae* and *S. paradysenteriae*. Diarrhoea subsides within 48 hours.

Certain virus diseases like herpes zoster, lymphogranuloma inguinale, virus hepatitis, virus pneumonia and trachoma have also responded well to oxytetracycline.

Rickettsial diseases like epidemic and endemic typhus, and scrub typhus have been shown to be effectively treated by oxytetracycline. In typhus fever an initial dose of 3 g. followed by 1 g. every hour is effective; clinical improvement starts within 24 hours and patient becomes well in 2-4 days.

In 'Q fever' very good results have been obtained and oxytetracycline appears to be more effective.

### Neomycin

Neomycin is isolated from an actinomycete belonging to the genus *streptomycin fradiae*.

It is active against a wide range of Gram-positive and negative organisms, specially mycobacterium, and not against fungi.

It has got certain advantageous properties, viz.: (*a*) Active against streptomycin-sensitive and streptomycin-resistant strains; (*b*) Considerable activity against various forms of *M. tuberculosis* and other mycobacteria, (*c*) Limited or no toxicity, (*d*) Lack of resistance against neomycin among the organisms sensitive to it.

It has not so far been possible to obtain neomycin in the crystalline form and thus its chemical nature is not understood. It has not become popular as an antibiotic in general medical practice.

### Bacitracin

Bacitracin is an antibiotic produced by an organism *Bacillus lichniformis* which is closely related to bacillus subtilis differing only in a few minor characteristics. Bacitracin is toxic to the kidneys. This toxicity is considered to be an inherent property of the drug itself and not due to any impurity. For this reason it should be used only in those cases which cannot be successfully treated with other chemotherapeutic agents. However, the principal advantage for its use is that it rarely sensitises patients and is in this respect superior to penicillin for local use. It also possesses a marked synergistic action with penicillin and a few other antibiotics. The use of this synergism is of particular value in the treatment of subacute bacterial endocarditis when the infecting organisms are penicillin-resistant strains of staphylococci or streptococci.

Bacitracin is absorbed rapidly after an intramuscular injection. Oral administration does not result in reasonable blood concentration, the greater portion being recovered from the faeces. Because of its nephrotoxic action, its parenteral use is at present limited to hospitals and clinics only. It also produces local pain and injury after intramuscular injection.

*Antibacterial activity and clinical use*—Bacitracin has got a marked activity against the Gram-positive bacteria, *c.f. Staphylococcus aureus*, pneumococcus, $\beta$-haemolytic streptococci and some strains of Clostridia.

In combination with penicillin (10 to 1), the best results have been obtained in the treatment of sub-acute bacterial endocarditis. Doses of 1,000,000 units penicillin and 100,000 units of bacitracin daily have given very gratifying results.

In combination with streptomycin and polymyxin, this drug is used in the treatment of gastro-intestinal disorders like ulcerative colitis. Tablets containing 250 mg. streptomycin, 200,000 units polymyxin and 5,000 units of bacitracin may be given in doses of 1 tablet 4 hourly daily for 1-3 weeks. It has also been used in the treatment of staphylococcal meningitis intrathecally, and also in other staphylococcal infections like osteomyelitis, bacteraemia, pneumonia and surgical conditions.

### Erythromycin

Erythromycin is obtained from the fermentation liquors of *Streptomyces erythreus*. It was first described by McGuire and his colleagues in 1952. They found erythromycin to be active against a wide variety of micro-organisms, including strains of penicillin-sensitive and penicillin-resistant staphylococci, and of relatively low toxicity both for laboratory animals and in preliminary trials in man. Like penicillin it is a highly selective agent and differs in this respect from the broad spectrum antibiotics such as chloramphenicol and tetracyclines.

Tests done on more than 1,000 bacterial strains in Boston indicated that erythromycin was most active against Gram-positive cocci and against strains of Neisseria, diphtheria-bacilli and Haemophilus, but for practical purposes it could be considered inactive against most coliform and enteric bacilli.

Erythromycin may be either bacteriostatic or bactericidal depending on the sensitivity of the organism and on the concentration of the antibiotic. Erythromycin exerts its effect only against actively multiplying bacteria. As it is likely that both erythromycin and penicillin act in a similar manner, it seems reasonable to combine the two together in therapeutics if this seems desirable.

No serious side-effects have been reported following the therapeutic doses of erythromycin. The use of excessive and very large doses may at times give rise to nausea, vomiting and diarrhoea.

For adult patients the dose recommended is 300 mg. every 6 hours. For the average child 200 mg., and for infants and young children 100 mg. every 6 hours is recommended. As the gastric acid interferes with the absorption of

erythromycin, the use of tablets coated with an acid-resistant and alkali-soluble substance has been recommended.

If for any reason a patient is unable to take erythromycin orally, 250 mg. of a preparation suitable for intravenous administration is dissolved in a buffer solution and injected every six to eight hours.

The use of a 1 per cent ointment in a petroleum base for the treatment of pyoderma in children has been described.

### Polymyxin

It is an antibiotic derived from a soil organism, *Bacillus polymyxa*. It is highly active against Gram-negative organisms including *Haemophilus pertussis* and *Klebsiella pneumoniae*.

Clinically striking results have been obtained by its use in pertussis in children who are seriously ill. Good results are also obtained in infantile gastro-enteritis when the drug is given orally. In severe cases of such infections the total daily dose is based upon 3-5 mg. per kilogram body weight divided into 8 equal doses at 3 hour intervals and given in a special buffer solution of *p*H 7·4.

All specimens of this antibiotic have produced varying degrees of renal damage. It may be only mild in the form of a rise in the specific gravity of urine or in severe form there may be oliguria with albumin, cast and red blood corpuscles in the urine and a raised non-protein nitrogen. Histamine-like reactions, hyperaesthesias and fever have also been noted. Because of these reactions, the general use of polymyxin seems to be contra-indicated.

### Gramicidine and Tyrocidine

Gramicidine is an antibiotic obtained from *Bacillus brevis*. This substance along with tyrocidine has bactericidal properties against most Gram-positive coccal pathogens. Under certain conditions it is also active against some Gram-negative species. Its components are effective only when placed in direct contact with the infecting bacteria and not when administered by mouth or systemically. That is why this antibiotic is of value in local treatment of ulcers and infected wounds.

### Gramicidine S

This is produced from *B. brevis*. It has a more potent action against staphylococci than tyrocidine or gramicidine or each combined. It has a selective action on Gram-negative bacteria. The dysentery group of bacilli are among susceptible organisms whereas typhoid and paratyphoid are resistant to it. Gramicidine S kills enterococci which play an important role in septic processes and which are resistant to penicillin and sulphonamides. Its use is mostly in surface wound dressing.

### Streptothricin

This antibiotic was first discovered in 1942 from a soil organism identified as *Actinomyces lavendulae*. It has bactericidal action against certain Gram-negative bacteria, e.g., *E. coli*.

Streptothricin is suitable for application to infected wounds and mucous membranes including the conjunctiva. This is also useful in the local treatment of burns. Systemic use of this antibiotic is not suitable.

### Subtilin

This was discovered by Jansen and Hirschmann in 1944 and was found to be active against the *Mycobacterium tuberculosis*.

### Comments

An indiscriminate use of antibiotics should be avoided as it leads to harmful results. There has been an increase in the number of resistant strains of organisms and the occurrence of crossed resistance between aureomycin, oxytetracycline and chloramphenicol has been noted and should be borne in mind.

Antibiotics may have other therapeutic effects apart from being only bacteriostatic or bactericidal. For example, aureomycin prevents the development of some experimental anaemias and has some beneficial effect on hepatic cells in cases of hepatitis and cirrhosis. It is also of some value in post-irradiation sickness.

Antibiotics are tools of great value in the hands of trained physicians and surgeons who have studied the possibilities and potentialities of these drugs with care and who are keen to use them with mature judgment. All acute bacterial diseases are controllable with these drugs either alone or in combination, but there is danger also in that many microbes become resistant as a result of the use of antibiotics in suboptimum dosages. Each clinician must, therefore, use his own judgment and discretion in using these potent remedies in dosages considered adequate for a particular patient with a particular type of infection. At present there is probably more abuse than judicious use of antibiotics.

# GLAUCOMA

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The word 'glaucoma' had its origin from an ocular disorder termed as 'glaucosis' which is marked by a greenish or bluish-grey pupil—a term mentioned in the writings of Hippocrates. From his writings it appears he referred to those cases of blindness which were associated with dilated dark blue pupils.

The term 'glaucoma' is not confined to a particular disease entity but embraces a wide range of ocular conditions which have in common an abnormal elevation of intraocular pressure resulting in anatomical and functional changes. Though in the general sense glaucoma indicates a rise in the normal intraocular pressure, it must be clearly understood that the anatomical and pathological changes in an eye depend on the adaptability of the particular eye to the intraocular pressure to which it is subjected. Though in most of the cases the pathological changes are the result of rise of intraocular pressure, in an insignificant proportion of cases, what is called a 'normal' pressure may not be conducive to and compatible with uninterrupted healthy functions of the eye. In the latter group of cases 'tension tolerance' is below the average group. Conversely, there are cases which do not show any pathological changes inspite of higher base pressure than what is recognised as normal. These cases have a 'tension tolerance' above average.

In order to understand the pathological effects of elevated intraocular pressure, it will be worth while to review the formation and circulation of the aqueous humour. Whatever may be the mechanism of its formation—a considerably controversial subject—it has been generally accepted that aqueous humour is formed from the ciliary processes. From phylogenetic, experimental and clinical evidences the canal of Schlemm has been definitely established as the chief exit-channel of the aqueous from the eye. The aqueous, thus, circulates from the posterior chamber into the anterior chamber through the pupil and then goes out through the canal of Schlemm.

The normal intraocular pressure in man is the lateral pressure exerted by the intraocular fluids against the coats of the eyeball which the eye can tolerate without damage to its integrity and which is compatible with the healthy function of the eyeball as a whole. The pressure, on an average, usually ranges between 18 to 23 mm. of Hg. (Schiotz). In a normal eye, the normal pressure level is maintained at a fairly constant level. Apart from the fact that there is a normal slight variation of 1 to 2 mm. of Hg. in the intraocular pressure which follows pulse and respiratory rhythm, there is a normal diurnal variation of pressure amounting to about 3 mm. of Hg.

In considering glaucomas, it is better, for the present, to confine oneself to those cases where there is abnormal elevation of intraocular pressure and whose 'tension tolerances' are within average limits.

Broadly speaking, glaucoma can be caused if the rate of formation of aqueous is more than normal, or if there is an obstruction to the circulation of the aqueous or a combination of these two factors.

Glaucoma is classified as
(1) Congenital or
(2) Acquired.

In congenital glaucoma (buphthalmos, hydrophthalmos) the cause is attributed to a congenital defect of the chamber angle, which may either take the form of persistence of a great amount of the mesodermal meshwork or failure of separation of the root of the iris from the sclerocorneal junction or non-fenestration of the ligamentum pectinatum iridés. Congenital or infantile glaucoma may also be associated with other developmental anomalies, such as aniridia, neurofibromatosis, microcornea or angioma of the face.

Acquired glaucoma may be primary or secondary. Primary glaucomas are those which do not follow other ocular diseases and secondary glaucomas are secondary to other diseases of the eye.

## Secondary Glaucoma

Most of the secondary glaucomas are due to a mechanical obstruction to the circulation of the aqueous ; a few cases, however, are due to overproduction and alteration of viscosity of the aqueous, such as cyclitis or iridocyclitis.

Secondary glaucomas due to mechanical blockage of the trabecular spaces may be by the iris itself or by particulate matters.

1. Obstruction by iris—following widespread adhesion of iris to the corneal scar, in intumescent cataract or dislocation of the lens into the anterior chamber, due to delayed formation of the anterior chamber following cataract operation or in association with active or healed iridocyclitis with blocked angles.

2. Obstruction by particulate matters—Glaucoma capsulare, due to obstruction by lens parti-

cles, following massive haemorrhage into the anterior chamber, due to tumour, cellular debris etc.

Secondary glaucoma may occur due to lack of communication between the anterior and posterior chambers following ring synechiae or occlusio pupillae.

It may also follow obstruction to the venous drainage—obstruction to the vortex veins or anterior ciliary veins. It also follows thrombosis of the central retinal vein and in rubeosis irides in diabetics where there are newly proliferated blood vessels involving the Schlemm's canal.

### Primary Glaucoma

During the last ten years a new conception regarding adult primary glaucoma has been evolved and has been accepted as a working basis. It is very difficult to say how long this conception is going to last or what changes are in store for it —for no other subject in ophthalmology has undergone such revolutionary changes in its conception as this interesting, at the same time, incapacitating disease.

The present conception, in short, is as follows:

In the case of simple glaucoma, there is usually no abnormality in the width of the chamber angle. Even if the anterior chamber is relatively shallow, there is no obstruction by the iris of the angle of the anterior chamber or the trabecular spaces during the time the intraocular pressure is raised. In acute glaucoma, however, there had been a pre-existing anatomical narrowness of the chamber angle. When certain other secondary angle-narrowing factors, such as dilatation of the pupil by mydriatics or congestion of the ciliary body etc., supervene, an acute episode starts. The rise in the intraocular pressure in these cases are the result of secondary angle-narrowing factors in an already pre-existing narrow chamber angle. Hence the rise of pressure is rather rapid and acute.

### Chronic Simple Glaucoma

Of all the types of glaucomas, chronic simple glaucoma should occupy the most important place because of the number of individuals affected and its incapacitating effects. Because of its insidious origin and usually asymptomatic nature, its recognition even in expert hands becomes a matter of great difficulty, not to speak of general practitioners.

It occurs in either sex usually between 45 and 55 years. The subjects are quite different from those affected with acute glaucoma who do not suffer from any psychological disorder but who are generally the subjects of vascular sclerosis.

In the early stages of chronic simple glaucoma subjective symptoms are usually completely absent. It is insidious in onset and slowly progressive in nature. The field changes and changes in the optic nerve head occur early and insidiously, so much so that in most of the cases the sufferer is unaware of the disability that has been fast approaching.

Significant symptoms are mild headaches and eye-aches coming on after prolonged desk work, not accounted for by refractive errors, and which disappear after sleep. A frequent change (increase) in the presbyopic correction is significant. Increase in the light minimum and slowness in dark adaptation, so that patients take longer time to get used to the dimly lighted room, should be investigated thoroughly to rule out other causes of delay in dark adaptation. If the condition is bilateral, an observant person may notice a defect in the visual field. In a few cases patients may complain of seeing rainbows and halos round the lights. While these symptoms, which are often unheeded, may be a pointer to the glaucomatous condition, in quite a good number of cases the patients do not come for relief till they become almost blind in one eye and the vision in the other eye seriously impaired.

The diagnosis of chronic simple glaucoma is not easy at the hands of the general practitioners and it must be left to the specialists. Reliance is usually placed on three objective signs—raised intraocular pressure, field changes (peripheral and central) and changes in the optic nerve head.

The initial change in the intraocular pressure is not so much a rise of tension over what is considered normal as an exaggeration of the normal diurnal variation. Hospitalisation is necessary in the initial stages to plot out variations of pressure during 24 hour period. A variation of over 5 mm. of Hg. (Schiotz) should always excite suspicion of glaucoma even if all the readings lie under the limits of what is recognised as normal (23 mm. of Hg.). This is now recognised as 'low-tension glaucoma'. This constant variation of intraocular pressure may cause great damage to the eye where the lamina cribrosa is weak or where there is much vascular sclerosis. This type of glaucoma usually carries a graver prognosis in its trail and is much more difficult to treat than an eye which can carry out healthy functions until the base pressure becomes high.

In the ordinary group of cases, however, the tension returns to normal in between the phasic variations. So if a 24 hour tension curve is not taken, the reading might be taken at a time when the tension has already returned to normal and the diagnosis completely missed. As the condi-

tion proceeds unchecked, the variations increase and the normal level is no longer obtained. The difference between the "peak pressure" and the "base pressure" is diminished and the eye is thus subjected to constant elevation of intraocular pressure.

If the tension does not show any instability or the base pressure does not show any elevation, provocative tests may be applied to investigate its behaviour under stress.

The field changes in chronic simple glaucoma are very important. Careful and repeated charting of the peripheral and central fields—peripheral by perimetry and central by Bjerrum screen—is essential. It is also essential to keep in mind the value of quantitative perimetry and scotometry, for a small defect may not be evident with a large object whereas a small object may furnish an important clue to the diagnosis.

The earliest sign usually takes the form of a small scotomatous area in the same isopter as the blind spot. The defect is usually relative at first, but subsequently becomes absolute. This usually takes the shape of a sickle, with the concavity of the sickle directed towards the fixation point (Seidel's sign). This scotoma may be either above or below the blind spot and is usually continuous with it. If not, if the arms of the scotoma are extended, they meet the blind spot at its apex. Later on, however, the defect becomes considerable (Bjerrum's scotoma).

In the early stages the peripheral field shows a depression. Later on the upper nasal quadrant or sometimes the lower nasal quadrant tends to show sectorial defects with a characteristic sharply defined horizontal edge (Ronne's nasal step). Gradually contraction becomes more marked in all meridians. The central vision is lost at a very late stage, so that patients with advanced stage of glaucoma have only a tubular vision. Because of the retention of the central vision till a late stage of the disease, tragically the patients do not realise the extent of mischief that has already been done to their eyes. Still later, however, the central vision is abolished and only a paracentral patch on the temporal side persists. When this also disappears the eyes reach a stage of absolute glaucoma, when the patient becomes totally blind and even the perception of light is abolished.

The changes in the optic nerve head are early, insidious, slow, gradual and progressive. The cupping of the optic disc in a fully developed state is complete and the sides of the cup are steep, not shelving. The retinal vessels appear to be broken off at the margins of the optic disc. There is always certain amount of atrophy associated with cupping in a glaucomatous process. In early cases, confusion might arise in distinguishing the condition from an atrophic cup (in primary optic atrophy). All the evidences have to be weighed carefully before it is possible to come to a definite conclusion.

It is now recognised that two factors play important roles in the production of the changes in the optic nerve head—direct mechanical pressure forcing the lamina cribrosa backwards and kinking the nerve fibres against the sharp scleral shelf and secondly ischaemia.

*Treatment*—As soon as chronic simple glaucoma is diagnosed treatment by miotics should be instituted. It was previously thought that miotics act by opening up the chamber angle. With the introduction of the gonioscope it has been possible to visualise the chamber angle and at present it is the considered opinion that in chronic simple glaucoma the chamber angle is by no means narrow. It is now thought that the effectivity of miotics lies in their vasodilatory action in counteracting the spasmodic vasoconstriction characteristic of the glaucomatous state. It is justifiable to use the miotic so long as the visual fields do not show any further deterioration and the base pressure is kept at a reasonably constant level. But it is imperative that the patient should submit himself to frequent check-ups.

The ideal miotic is pilocarpine (0·5 per cent to 1 per cent). It is instilled three or four times a day. Particular care must be taken to see that the drops are instilled at such times of the day as the daily phasic variations in ocular tension occur. If for some reason or other the operation is considered inadvisable and if pilocarpine, by itself, is not able to control the tension, it may be combined with eserine sulph 0·5 to 1 per cent) or stronger cholinergic drugs such as DFP may be applied. In very advanced cases where the field of vision has been reduced almost to the fixation point, it is inadvisable to operate as it may lead to sudden collapse of the field and result in complete blindness. These cases are better treated with miotics.

If the tension is not controlled by the use of miotics and/or if the field changes show progressive deterioration, no time should be lost in undertaking an operation, the principle of which is to establish a filtering scar. (The details of the several operative procedures, the special indications for each, their advantages and disadvantages are not within the scope of this article.)

It is unfortunate that in glaucoma what is lost is lost for ever. With that view in mind, it is essential that attempts should be made to arrest the

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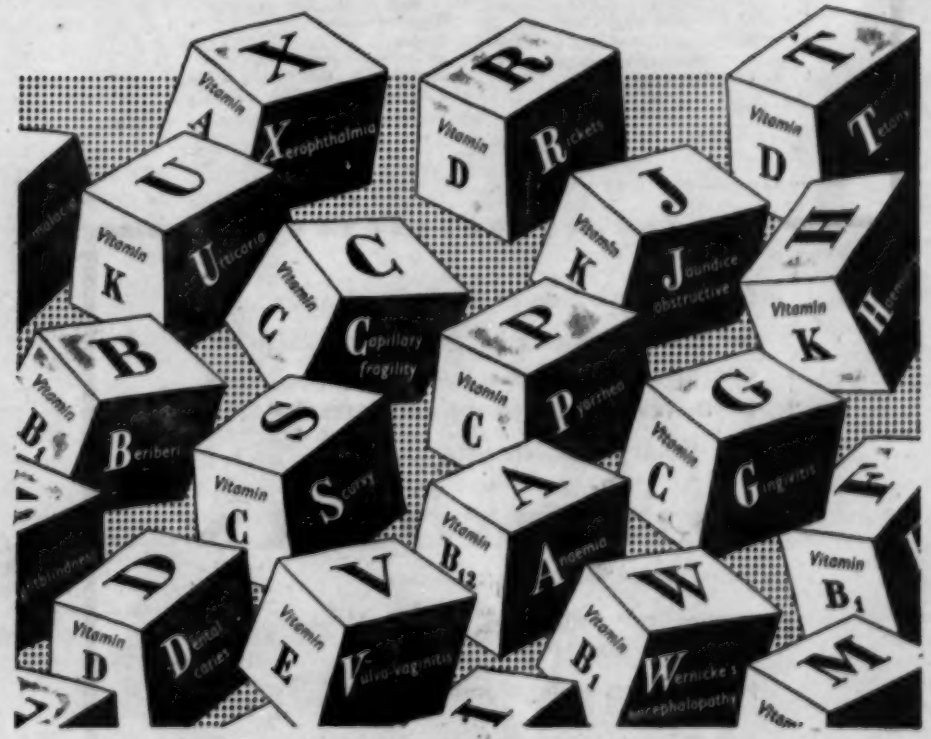


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disease in its early stages by miotics and if necessary by operation. The result of the operative procedures are uncertain as the fistulising operations, apart from their drawbacks and complications, can only control the factor of raised tension but has no effect on the element of vascular sclerosis. In the latter group of cases, inspite of the operation, the vision continues to fall and the field shows progressive deterioration. In these unfortunate cases, miotics should be continued for their vasodilatory effect and general treatment with nicotinamide should be continued for a prolonged period.

On the whole treatment of chronic simple glaucoma is very unsatisfactory as we do not cure the disease but we attempt to control the pressure —a palliative measure only and by no means curative.

### Acute Primary Glaucoma

This is more commonly seen in women between 50 and 60, though this is not infrequent at an earlier age. Sympatheticotonic individuals with vasomotor instability and individuals who are highly strung and of worrying type are the usual sufferers.

Usually hypermetropic eyes with shallow anterior chambers and narrow chamber angles are affected. The chamber angle is so often narrow in acute primary glaucoma that it is sometimes called narrow-angle glaucoma. It is now-a-days held that acute primary glaucoma seldom occurs if the chamber angle is not narrow. Acute congestive attacks are associated with closure of the chamber angle, partial or complete. Usually secondary angle-narrowing factors in an already pre-existing narrow chamber angle precipitate an acute congestive attack.

An acute congestive attack is usually preceded by prodromal symptoms, such as blurring of vision, halos around lights and occasional headache when there occurs sudden rise of tension but the eye remains white and without any signs of congestion. These attacks are usually caused by worry, anxiety overwork or excitement and are most likely to be precipitated by factors which produce a dilatation of the pupils. They are usually transitory and disappear after rest or sleep. They usually occur at first intermittently but soon the attacks become more frequent. Sooner or later, however, an acute congestive attack occurs when the eye becomes intensely suffused and congested. The vision rapidly fails and there is acute pain in the eye which spreads to the other branches of the fifth nerve. Associated with these ocular symptoms and signs, the patient often complains of nausea and vomiting, there is slight elevation of temperature and the patient looks really ill. The condition has a dramatic onset and in a few hours' time the patient becomes practically blind.

In an acute congestive glaucoma, the lids become swollen, the conjunctiva chemosed and intensely congested and the ciliary injection is marked. The cornea is steamy and insensitive, the anterior chamber very shallow and the pupils become dilated, oval and immobile. Pupillary reactions are absent. Tension is raised and ophthalmoscopic examination becomes impossible owing to the cloudiness of the cornea.

The condition, if not relieved, may lead to total permanent blindness. Some cases do, however, show spontaneous regression and pass on to a chronic congestive phase in which some amount of congestion and irritability persists and the tension remains permanently elevated. This is usually due to the root of the iris becoming firmly anchored to the back of the cornea forming a 'false angle'. This causes permanent embarrassment to the drainage due to the formation of peripheral anterior synechiae.

There is usually not much of a change in the visual acuity or visual field up to the stage of an acute attack, but after the attack, when the acuteness is relieved, both the visual acuity and the peripheral fields show depression. The changes in the optic nerve head (cupping) is not usually evident after an acute attack, but usually appears in the chronic congestive phase, as for the development of this, a high tension for a prolonged period is necessary.

If the condition is not relieved in the acute stage or if it be allowed to persist in the chronic congestive stage with intermittent exacerbations, the ultimate fate of the eye is total blindness (stage of absolute glaucoma).

*Treatment*—Ideally the treatment of this type of glaucoma should start in the prodromal stage by instillations of pilocarpine 0·5 to 1 per cent or eserine 0·25 to 0·5 per cent. The instillations of these drops should preferably be at least half an hour before the rise in the intraocular pressure as shown by the twentyfour hour tension curve. Clinically they should be instilled before the halos habitually appear and not necessarily two or three times a day disregarding the time of variation in the tension curve.

When an acute congestive attack develops, the case should be treated energetically and without any loss of time. If the case is seen early, attempts

should be made to lower the tension by medical measures, as operation on a congested, chemosed and painful eye is not without danger or difficulty. The medical measures consist of instillations of eserine 1 per cent (may be combined with pilocarpine 1 per cent) at five-minute intervals for half an hour and then at half hourly intervals, sedatives such as morphia ¼ gr., hot bathings to the eye, intravenous hypertonic saline or glucose and application of leeches to the temple. Instillation of eserine to the unaffected eye as a routine measure is advisable to prevent the onset of an acute congestive attack in the other eye.

If the case responds to miotic treatment as indicated by relief of pain and congestion, disappearance of corneal oedema and constriction of pupil, it is better to wait until the eye becomes quiet before operating. A filtration operation, such as trephining or iridencleisis is usually the operation of choice.

If, however, the case fails to respond to miotic measures, it is unjustifiable to wait beyond 24 hours before undertaking an operative procedure. The choice of operation in an unrelieved acute congestive glaucoma is iridectomy-dialysis whereby the iris is torn from its ciliary attachment over a considerable portion of the circumference.

### Epidemic Dropsy Glaucoma

Epidemic dropsy is rather common in our country amongst people who take contaminated mustard oil. The seeds of mustard oil are usually mixed with the seeds of *Argemona mexicana*. The alkaloid responsible for the causation of epidemic dropsy is 'sanguinarin'.

Histopathological studies in cases of epidemic dropsy showed marked dilatation of the capillaries of the skin, pericardium, peritoneum, iris and ciliary body without leucocytic infiltration. In 1909, Maynard first noted rise in intraocular tension in 100 patients with epidemic dropsy in India. Subsequently this was corroborated by many other workers in India. They found a toxic histamine-like substance in the aqueous humour. Histological studies of the glaucomatous eyes in epidemic dropsy showed no obstruction to the filtration angle, but an intense non-inflammatory capillary dilatation of the whole uveal tract with increased endothelial permeability was quite evident.

Argemone oil is the only known substance capable of causing human glaucoma. It affects all ages and both sexes are equally involved. The glaucoma, when it occurs in epidemic dropsy, is usually of high-tension type and without any signs of congestion. The anterior chamber is either normal or deep but never shallow. Pain is usually absent but the patients often complain of seeing halos and rainbows around lights. In very acute cases retinal haemorrhages have been observed. The field changes and cupping of the discs are like that of chronic simple glaucoma. When epidemic dropsy subsides, there is a rapid decline in the intraocular tension towards normal.

It has been roughly estimated that 10 per cent of people suffering from epidemic dropsy get glaucoma. During an epidemic, glaucomatous conditions are often seen in cases without any other clinical manifestation of epidemic dropsy.

*Treatment* should be directed towards the general condition by complete stoppage of mustard oil, change of environment, and high doses of vitamin B-complex and vitamin C. Miotics have very little effect on the intraocular tension. Adrenalin drops can be instilled with advantage. Regular charting of the peripheral field and scotometry should be done.

If these show progressive deterioration, surgical measures should be adopted without delay. It is not infrequently that one encounters cases of total blindness in epidemic dropsy due to neglect of this procedure.

*SPECIAL ARTICLE*

## MEDICAL EDUCATION —A HISTORICAL SURVEY

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At the dawn of history, magic, religion and medicine were practised by the same person, very often, a priest. The earliest medical texts and prescriptions were written in the cuneiform script on clay tablets about 3000 B.C. and were discovered in Mesopotamia. Surgery was almost unknown in this Sumerian period of culture. But according to Osler "the first figure of a physician to stand out clearly from the mists of antiquity" was Imhotep (about 2900 B.C.), prime minister to King Zoser of Egypt. He was a great architect also, and built the oldest pyramid, the step pyramid, at Sakkara in Egypt. Since his time there were medical schools mostly connected with temples where the students were taught how to elicit history from patients, the methods of clini-

cal examination including the inspection and palpation, with special emphasis on the rate and quality of the pulse and its value in prognosis. Most of the diseases were called after the leading symptoms. Surgery too was taught in these schools. Siegerist (1951) is of the opinion that specialisation in medicine was prevalent in Egypt as early as 1500 B.C., and there were physicians for the head, eyes, belly and for the teeth. Their medical texts now preserved as papyri—The Papyrus Ebers on medicine, the Smith Papyrus on surgery and the Kahun Papyrus on gynaecology—give us a fairly good idea of the medical knowledge of the Egyptian physicians practising between 2000—1500 B.C. By about 1000 B.C., the Egyptian empire had declined and till the era of Greek culture, there was very little progress in medicine in this part of the world.

About 1500 B.C., in India too, medical education was being given to the student. In the days of Susruta and Caraka, the student was apprenticed to a teacher who was good both in the theory and practice of medicine. The selection of the candidate was fairly strict as the boy ought to be from a good family, young, intelligent and well-versed in the scriptures. There was a preliminary test before selection was made. After the initiation, the student served with his teacher for years —observing and assisting him in the treatment of the sick and in the preparation of the medicaments. The teacher would explain every word of the sacred texts on the subjects and the pupil would repeat the explanation (Jolly, 1951). Susruta emphasised that every good surgeon should have a sound knowledge of anatomy and described the technique of preparing and dissecting the human body. To acquire operative skill, sections were made on gourds and cucumbers; dental extraction was done on dead animals and they were trained in the use of over 100 surgical instruments, 20 types of catheters or tubular instruments. They used different types of suture materials with straight and curved needles. The students were taught plastic surgery too, particularly, rhinoplasty. Susruta stressed that the hands were the best instruments. In those days, the students learnt medicine, with its humoral pathology, embryology, midwifery including operative obstetrics, pediatrics and toxicology. After the completion of the practical training on recommendation from the teacher, the king gave permission for the student to practise medicine (Zimmer, 1948). About the same time or even earlier, in China also medicine was being practised and taught. Shen Nung (about 3000 B.C.) wrote Pen Tsao—Chinese materia medica. Hwang Ti (2650 B.C.) wrote his book of medicine "Nei Hung"; and Hua Tu (115-205 A.D.) was performing numerous major surgical operations.

In Greece, medicine was being taught and the sick were healed in temples or Aesculapia, called after Aesculapius—a demigod or "a shadowy figure who may have had a human existence about 1250 B.C." (Guthrie, 1946). But the greatest among the Greek physicians was Hippocrates (460—355 B.C.). He was born in the island of Cos, near Asia Minor and was taught by Herodicus and by his father Herocleides. He saw his patients and taught the students beneath a big tree which still stands in that island. Hippocrates wrote numerous works on medicine but the greatest contribution of his was the importance he attached to the bedside observation of the patient as a clinician. He kept a sincere record of his findings in various diseases of his successes or failures in the treatment of varied conditions. When Alexander the Great died in 331 B.C., Egypt with Alexandria as its capital came under the Ptolemies and became a centre for medical learning. There was a famous medical school and a vast library in this city. Herophilus taught anatomy to the medical students here. Erasistratus, grandson of Aristotle, came to this school to learn anatomy of the central nervous system. Both Erasistratus and Herophilus were later accused by Celsus of dissecting on criminals when alive (Gask, 1950). But the dissections were made not on human bodies but on dead animals. Numerous original workers like Apollonius, Hegetor, Paul of Aegina and Palladius were working in this school. Students flocked to it from the neighbouring countries to study medicine till the city was captured and destroyed by the Arabs in 640 A.D.

Three hundred years after Hippocrates, with the defeat of the Greeks by the armies of Caesar, Greek medicine migrated to Rome where the medical practice and teaching continued to remain mostly in the hands of the Greeks. The apprentice system was practised by the Greeks and the Romans. But the earliest medical school was established in Croton, southern Italy, in the 5th century B.C. Among the Roman school of physicians —the best known are (*a*) Celsus who, about 30 A.D., wrote eight books on medicine, besides philosophy and law, (*b*) Soranus (78—117 A.D.) author of a text book on midwifery and gynaecology which was read by medical students for the next 14 centuries and lastly (*c*) Galen who was born in 130 A.D. and had his medical schooling at his native town of Pergamum (Greece) and later on at Alexandria. He settled in Rome working under four emperors and wrote voluminously on medical subjects with such dogmatic assertions that his books were looked upon as standard texts

of orthodox medicine and his theories went unquestioned till the time of the Renaissance—for nearly 15 centuries.

After Galen, the Roman empire declined and about the 5th century the Arabs started making their contributions to this field of science. In Jundishapur (Persia) a medical school was started by Nestorius and for two centuries it was the medical centre for training students. The Arabs preserved the Greek medical texts and translated them into Arabic. Their main contribution to medicine was alchemy or pharmacology. During this period when in most of the christian countries under the patronage of the church medicine was mainly 'faith-healing', notable work was done by the muslim physicians chiefly—by Rhazes (860—932 A.D.), Avicenna (980—1037 A.D.) and Abucasis (936—1013 A.D.). Rhazes, so called because he was born at Rai in Persia, started medicine late in life, at the 40th year, but soon had a wide practice in Bokhara and Bagdad. He wrote numerous medical books of which "El Hawi" is important. His method of teaching was in the Hippocratic style—stressing the clinical observations in different diseases. Avicenna also worked in Bokhara and is called 'Prince of Physicians'. He was an infant prodigy reciting the Koran by heart at an early age of ten and was made the court physician even before he passed his teens. The 'Qanun' or 'Canon of medicine' is his greatest work. He taught in the typical Galenical fashion —with theories and numerous dogmas to explain the causation and progress of different diseases. Abucasis was born in Cordova which had a big library, 50 hospitals and a famous medical school since the 8th century. He wrote texts in medicine and surgery. The books written by these workers were used by medical students till the 13th century, when the Muslim power waned and with it there was no medical progress till the time of the Renaissance except at Salerno, near Naples.

This medical school at Salerno, started in the 9th century, by a Greek, a Latin, a Jew and an Arab, was perhaps the first medical institution where a student after reaching 21st year had to undergo a five year course of training followed by examinations and a practical training of one year under an older physician. Following this, the king awarded him the diploma—a ring, a laurel wreath, a book and the kiss of peace—after which he was entitled to style himself a "Doctor". This school again was the first to train women students and later was staffed by famous women teachers like Trotula, Rebecca and Constanza. Trotula was an authority in obstetrics and wrote a book on the subject. Unfortunately, Salerno was sacked by Henry VI in 1194 after which much of its prestige was lost. But it continued to train medical students for nearly 600 years more before Napoleon abolished it in 1811. But by the 12th century, the doctors trained here had established schools in their own countries. Of these, the medical schools at Padua and Bologna (Italy), Montpellier and Paris (France) became famous.

During the Mongol dynasty (1280—1368) in China, the Emperor Khublai Khan introduced system of medical examinations before the license to practise was given. According to Fulton, the first medical school in China was established at Peiping during the Ming dynasty (1368—1644).

With the Renaissance, the progress of medicine became remarkable. Vesalius (1514—64) the greatest of anatomists was born in Brussels and studied in the medical schools of Montpellier and Paris. Appointed to the Chair of Anatomy at Padua at the early age of 23 years, by his keen observations he correctly described the different anatomical structures and disproved the anatomical superstitions which persisted from the time of Galen. Galen had taught that the uterus was bicornuate, the sternum was multisegmented and the liver was divided into the numerous lobes just as in animals. Till the 15th century, dissection of a human body was very occasional and was done on the bodies of criminals as a part of social function and entertainment—preceded by prayers and oration and followed by a concert and a banquet. The actual dissection was performed by a servant when the physician read out from Galen's book and pointed out the different structures with a wand from a respectable distance. After he became professor, Vesalius dissected the human cadavers carefully for six years and published his great work 'De Humani Corporis Fabrica'—with numerous illustrations. His lecture-demonstrations at the medical school in Padua were attended by nearly 500 students from the different countries. Harvey (1578—1657) educated at Cambridge and Padua was working in St. Bartholomews in London. He was a great experimental physiologist and his magnificient work 'De Motu Cordis' was published in 1628 after 12 years of careful research. He showed that the blood moves in a circle, the central motive force being the heart and not in a to and fro fashion as it was believed till then. The greatest surgeon of this period was Ambroise Pare (1510—1590) who had his first medical training as a dresser at Hotel Dieu, in Paris, a charitable hospital which had then been in existence for nearly 900 years. Later on, he worked as an army surgeon and earned a great reputation for his kind-

ness to his patients apart from his skill in surgery of gunshot wounds. He often used to say "I dressed his wound and God healed him". In Midwifery he reintroduced the operation of internal podalic version as an accepted procedure in complicated deliveries. This operation though known to the Greeks had fallen into disuse for centuries till Pare revived it. He was the first great surgeon to write books in the vernacular (French) instead of in Latin. Though the Faculty members in Paris failed to honour him, he was Surgeon to four successive kings of France. In the field of therapeutics, the name of Paracelsus (1493—1541) will long be remembered. He was professor of medicine at Basel, lecturing his students in German rather than the usual Latin and introduced numerous remedies—mercury, antimony and mineral salts into medicine and publicly ridiculed the mixture of herbs that Galen had advocated. He was the most controversial figure in medicine and probably one of the most conceited among the teachers. He said "all the universities have less experience than my beard, and that the dawn on my neck is more learned than my auditors" (Haggard, 1954). Still he is called 'Luther of Medicine' by Osler because of the radical reforms he introduced in medicine.

Following this great era in medicine, the religious differences forced new medical schools (for the protestants) to be opened mainly in Basel (Switzerland) and in Leyden (Holland). The one at Leyden soon earned a great name over the continent. Famous teachers like de Graaf, Van deVenter and Boerhaave taught in this school which attracted students not only from the continent but also from the British Isles and the North American colonies. Edinburgh was next in importance to Leyden. The Royal College of Surgeons of Edinburgh was started in 1778 and that of England in 1800. But the Royal College of Physicians of England was founded earlier in 1518 and got the royal charter in 1551.

It was only in the last century that tremendous progress has been made in the field of medicine as well as in medical education. Pasteur and Virchow put medicine on a more rational basis. Lister's antiseptic methods and the advent of anaesthesia made surgery safe. The rapid advance in surgery and medicine made specialisation inevitable. Fortunately the control of medical education has passed into the hands of the universities or special colleges which are entitled to control the education and hold examinations and confer the diplomas on worthy candidates by virtue of a royal charter. The youngest of such royal colleges is the Royal College of Obstetricians and Gynaecologists which celebrated its Silver Jubilee this year. Besides specialisation, another important feature with the turn of the 19th century has been the great stress on social and preventive aspects of medicine.

#### References


FULTON, J. F.—*Brit. M. J.*, **2** : 488, 1953.

GASK, G.—Essays in the History of Medicine, Butterworths, London, 1950, p. 46.

GUTHRIE, D.—A History of Medicine, Thomas Nelson & Sons, London, 1946, p. 43.

HAGGARD, H. W.—Devils, Drugs and Doctors—Pocket books, Inc. New York, 1954, p. 364.

JOLLY, J.—Indian Medicine, Translated by G. Kashikar, Poona, 1951, p. 32.

OSLER, W.—Quoted by Siegerist—History of Medicine, Vol. I, 1951, p. 290.

SIEGERIST, H. E.—A History of Medicine, Vol. I, Oxford Univ. Press, New York, 1951, p. 319.

SUSRUTA SAMHITA—An English Translation by K. K. Bhishagrathna, Calcutta, Vol. II, 1911, p. 172.

ZIMMER, H. R.—Hindu Medicine H. R., The Johns Hopkins Press, Baltimore, 1948, p. 84.


*CASE NOTE*

## ASSOCIATION OF MITRAL STENOSIS AND PLEURAL EFFUSION


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Idiopathic pleural effusion in combination with mitral stenosis is rarely seen. The following case where the association was noted seems to be interesting.


### Case Report

B.K.R., 23 years old, male, clerk, entered the hospital on April 6, 1954 for cough with scanty expectoration, irregular fever and haemoptysis.

The patient had been well till six months prior to admission when he first had an attack of common cold. Gradually an irritating unproductive cough developed and had persisted since then. About three and a half months before admission he felt pain over his right chest which lasted for about two weeks after which he began to have bouts of fever rising to 103°F daily in the afternoon with remission at late hours of the night. With the onset of febrile paroxysm the pain over

the right chest subsided. He had been treated outside with chloramphenicol to which the fever seemed to have responded. About two weeks after this he again began to have slow evening rise of temperature and this time he started coughing out sputum mixed with blood. He gradually became weak, lost much weight, the haemoptysis increased in frequency and at this stage he was admitted.

He denied having had any symptom relating to rheumatic fever or chorea in the past but had frequent nose bleeding in childhood. There was no history of tuberculosis in his family, neither he had history of any known contact.

Physical examination revealed the build and nutrition to be below average, moderate anaemia, no engorged neck veins, no cyanosis, jaundice, oedema or clubbing of fingers. Pulse rate was 114 per minute, respiration 24 per minute and temperature 100°F. Blood pressure 110 mm. of Hg. systolic and 65 diastolic. Examination of respiratory system showed slight displacement of trachea to the left, fullness, impaired movement and fremitus over the right chest. The percussion note was stony dull from the third interspace downwards in the midaxillary line on the right side and breath sounds were markedly diminished over the area. A diagnostic puncture brought out straw-coloured fluid which coagulated on standing. Radiologically a diffuse opacity of the right chest was found.

Precordial examination revealed slapping apical impulse over the 5th left interspace just outside the midclavicular line, a pre-systolic thrill and a rough crescendo type of diastolic murmur ending in short, sharp, accentuated first sound in the mitral area—typical of mitral stenosis. Pulmonary second sound was accentuated. Skiagraphy of heart showed no gross enlargement of pulmonary conus, and no appreciable enlargement of the left atrium. His liver was just palpable but not tender and the spleen was not palpable. Abdomen was soft. There was no evidence of free fluid in the peritoneal cavity.

*Investigations*—Haemoglobin—58 per cent (Sahli), W.B.C.—5000/cmm. with neutrophils 62, lymphocytes 32 and eosinophils 6 per cent. Malarial parasites—none found. E.S.R.—68 mm/hr. (Westergren).

Sputum—Repeated examinations were negative to acid-fast bacilli. Tuberculin test (Mantoux) showed marked reaction with 1 in 10,000 dil.

Pleural fluid—straw coloured, coagulated spontaneously on standing, lymphocytes fair number, no polymorphs.

Skiagraphy—The effusion on the right side was almost absorbed, pleural thickening was present.

Circulation time with decholin and ether combined was arm to tongue—20 seconds and arm to lung—8 seconds.

With strict bed rest, good diet and supportive treatment his general health improved. The effusion got absorbed but the cardiac signs persisted. He received no salicylates during his illness.

## Comment

It is commonly believed that mitral stenosis and pulmonary tuberculosis are mutually exclusive as congested lungs do not provide suitable nidus for the tubercle bacillus (Kayne *et al*, 1948). Kremer and Shapiro (1942) however reported association of mitral stenosis and pulmonary tuberculosis. The present case is one where mitral stenosis was associated with pleural effusion. Although no pulmonary tuberculous focus was discovered in this case yet as quite a large number of cases of idiopathic pleural effusion occurs in close time relationship with primary infection and as 80 per cent of idiopathic pleural effusions are tuberculous in origin (Kayne *et al*, 1948) and as haemoptysis, evening rise of temperature, high dilution tuberculin positivity, subsequent thickening of pleura, absence of joint pains and improvement without antirheumatic treatment were the features of the case, it might be concluded that the effusion in all probability was tuberculous in origin and not rheumatic. Whitaker (1954) stated that haemoptysis and nocturnal dyspnoea occurred commonly in patients with moderate or severe degree of pulmonary hypertension. In the case stated above there was no clinical evidence of pulmonary hypertension to explain the haemoptysis which was recurrent. Dyspnoea, engorged neck veins, systolic lift over the right ventricular outflow tract, a palpable pulmonary second heart sound—the features of pulmonary hypertension (Whitaker 1954) were absent in this case.

## Summary

A case of mitral stenosis associated with pleural effusion is reported.

That the effusion was probably due to tuberculous infection is discussed.

## Acknowledgment

I wish to thank Dr. A. K. Dutt Gupta, Principal-cum-Superintendent, Nilratan Sircar Medical College and Hospital for permission to report this case. Thanks are also due to Prof. N. R. Konar, and Dr. D. M. Gupta, for their helpful suggestions.

## References

Kayne, G. G., Pagel, W. W., O'Shaughnessy, L.—Pulmonary tuberculosis, 1948, Pp. 345, 348, Oxford University Press, London.

Kremer, H. S. and Shapiro, A. V.—*Quart. Bull. Sea View Hosp.*, **7**: 110, 1942.

Whitaker, W.—*Quart. J. Med.* (New Series), p. 111, 1954.

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## ANAESTHESIA AND CHLORPROMAZINE

Several anaesthetic agents came to be used after the discovery of ether by Morton in 1846, but for all practical purposes ether and chloroform held the field for nearly a century for most operations. Though there has been a slow evolution of methods and techniques which gave a tremendous impetus to the advancement in surgery, the drugs used remained more or less the same, their action being powerfully depressant to the central nervous system. For satisfactory muscular relaxation deep narcosis has to be produced by highly saturating the blood with these drugs with their unavoidable toxic action associated with grave disturbances to most of the vital organs and tissues of the body.

Attempts to avoid these undesirable effects have resulted in a changed concept for the production of anaesthesia. The present-day concept is to produce the minimum of depression of the central nervous system by light hypnosis and to secure analgesia and muscle relaxation by drugs possessing more or less a specific action of blocking of pain and motor nerve impulses respectively.

The common practice in modern anaesthesia is to induce anaesthesia by an intravenous barbiturate and maintain analgesia and light hypnosis with the nontoxic nitrous oxide potentiated by intravenous pethidine or a low concentration of ether or trichlorethylene and secure muscular relaxation by curarising agents intravenously.

More recently a newer concept is on trial in the evolution of anaesthesia on the basis of the concept propounded by Claude Bernard[1] that the autonomic nervous system controls our milieu interieur and the defence mechanism of the organism is brought into action through the mediation of the autonomic nervous system during stress, aggression and variations in the external environment. It is believed that this defensive mechanism is weak and unstable and in its attempt to maintain the constancy of milieu interieur against aggression, not unoften overdoes itself with injury to the very organism which it wants to preserve, sometimes even leading to a fatal issue[1].

Different types of aggression are responded to by different reactions of this defence mechanism. In defending the organism against an assault like that of a surgical trauma of any severity, the autonomic system might give way from overaction with resultant shock which may be irreversible. In combating the application of cold the defence responds after an initial vasoconstriction by shivering due to autonomic overaction with consequent unwanted increased metabolism, tachycardia, rise in oxygen consumption and temperature to neutralise the cooling of the body.

Laborit and Huguenard of Paris postulate that if this autonomic nervous system could be partially blocked and the inner defence mechanism inhibited, a condition will be obtained in which the external aggression will not rouse this unstable autonomic defence to unproportional levels with consequent harm to the organism. Such a condition more or less mimics the hibernating state of poikilothermic animals when there is suspended animation with reduction of vital activities, metabolism, oxygen requirement and body temperature.

Working on this hypothesis these French workers have been trying to produce a blockade of the neurovegetative system at all levels. This can be achieved to a certain extent by a deep anaesthesia with its associated disadvantages. But a drug with a specific blocking action on the autonomic nervous system analogous to the drugs with specific blocking actions on motor and sensory impulses like curare and pethidine respectively—so essential for anaesthesia—was unknown.

Only recently Laborit and Huguenard have claimed to have discovered a combination of neuroplegic drugs mainly phenothiazine derivatives to secure 'autonomicolysis' thereby producing a condition which they call 'artificial hibernation'. The principal constituents of this combination which they call the 'lytic cocktail' or 'liberation cocktail' are chlorpromazine, promethazine and pethidine, and they use it intravenously.

Chlorpromazine is claimed to possess a multitude of properties. One of its most prominent actions is said to be its capacity to depress the autonomic nervous system at all its levels with resultant stabilisation of the inner defence mechanism, thus increasing the subject's resistance to shock[2]. Its action on the thermoregulating mechanism leads to a lowering of the body temperature also. Both these actions are of great advantage during surgical operations and are likely to open up a new vista.

It has been reported from observations in experimental animals[3, 4] and also in clinical anaes-

[1] LABORIT, H. AND HUGUENARD, P.—*Presse Med.*, **59** : 1329, 1951.

[2] LABORIT, H., *et al*—*Presse Med.*, **60** : 206, 1952.

[3] COURVOISIER, S., *et al*—*Arch. Internat. Pharmacodyn.*, **92** : 305, 1953.

[4] LABORIT, H.—*et al*—*Presse Med.*, **60** : 120, 1952.

thesia[5-9] that chlorpromazine with or without surface cooling prevents shock to a degree hardly equalled by any other known agents.

If a reduction of oxygen consumption by the tissues to a marked extent could be secured by some means, much of the problems of cardiovascular and neurosurgery in which temporary exclusion of circulation is demanded would be solved in no time. The highly specialised areas of the brain with high oxygen requirement cannot withstand an abeyance of circulation for more than four minutes. By reducing the body temperature to 28°C the oxygen consumption is reduced to 15 per cent and it would appear possible, at least theoretically, to stop the circulation for twenty to thirty minutes, during which intricate operations in the brain requiring ischaemia or on the heart may be completed with impunity. Such vital organs as the kidneys and liver are expected to remain unaffected during periods of circulatory failure from surgical or other trauma if the oxygen requirements of these organs could be cut down.

It has been shown by Dundee and his colleagues[10] that a fall in body temperature of 3·4°C is associated with a reduction of oxygen consumption by approximately 20 per cent. The knowledge that a fall in oxygen consumption follows a fall in body temperature led to the development of several techniques for the production of hypothermia in man.

The simpler methods are immersion in cold water, ice pack and refrigeration blankets. Extracorporeal methods in which by an arteriovenous shunt the blood is made to pass through cooling devices outside the body and then re-introduced are complicated and carry their own risks.

Whatever the method adopted shivering has to be prevented by deep anaesthesia or curare, as otherwise not only the very object of hypothermia viz., the reduction of oxygen requirement is nullified but it may lead to dangerous ventricular fibrillation.

Chlorpromazine has been found to effectively prevent shivering[11] and as such may more safely replace curare or deep anaesthesia for the production of hypothermia by surface cooling.

However the hypothermia to be safe must be controlled as otherwise unlike the poikilothermic animals whose myocardium goes on functioning even at 3°-4°C, the human heart goes into fibrillation with undue lowering of the body temperature. From experiments carried on prisoners in concentration camps in Dachau it seems that survival after a hypothermia to 20°C is not probable[12]. It is also found that the likelihood of ventricular fibrillation increases with the lowering of the temperature below 28°C. It has occurred even at 30°C.

Chlorpromazine not only reduces the body temperature by a degree or two centigrade but according to Courvoisier it appears to lead to a tendency to make a homeothermic animal poikilothermic[13]. If so, then it is probably the first drug known to possess such a property. For so far no means are known by which a non-hibernator can be transformed into a hibernator.

Its capacity to reduce oxygen consumption by itself and in a degree out of proportion to its hypothermic effect has been reported[14] as well as contradicted[15].

The marked prophylactic property of the drug against shock combined with its apparently unique action on the thermoregulating mechanism as claimed, if established, is likely to open up immense possibilities in anaesthesia and surgery in general, and cardiovascular and neurosurgery in particular. It does not however reverse established shock but may actually do more harm by its peripheral vasodilating effect[16].

Its marked central depressant action has proved of value in premedication and potentiation of anaesthesia and relaxants. It is a powerful anti-emetic and has a definite anti-adrenaline action.

Apart from those already discussed a large number of properties both substantiated and unsubstantiated have been ascribed to chlorpromazine and apparently there is hardly any drug which can claim to possess so many actions.

The earlier overenthusiasm about the drug as is common with all new discoveries is now being subdued and its actual position is gradually coming to light. However, it is a drug which may prove to have wide applications and as such worthy of further detailed study.

Elsewhere in this issue appears a paper in which the author, an anaesthesiologist, has attempted to assess from his own experiences in fiftyfive cases the action of this drug in anaesthesia. It would be interesting to know the experiences of others.

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[5] ALLUAME, R.—*Current Res. in Anaesth. & Analg.*, **9**: 261, 1952.
[6] SMITH, A. AND FAIRER, J. G.—*Brit. M. J.*, **2**: 1247, 1952.
[7] DUNDEE, J. W., *et al*—*Brit. M. J.*, **2**: 1237, 1953.
[8] BARCLAY, R. S., *et al*—*Glasgow M. J.*, **35**: 235, 1954.
[9] BAXTER, R. W., *et al*—*Anaesthesia*, **9**: 79, 1954.
[10] Editorial—*Brit. M. J.*, **2**: 1250, 1953.
[11] DUNDEE, J. W., *et al*—*Anaesthesia*, **9**: 200, 1954.
[12] SELLICK, B. A.—*Middlesex Hosp. J.*, **54**: 145, 1954.
[13] DUNDEE, J. W.—*Brit. J. Anaesth.*, **26**: 382, 1954.
[14] DUNDEE, J. W., *et al*—*Brit. M. J.*, **2**: 1244, 1953.
[15] DORKIN, A. B., *et al*—*Anaesthesia*, **9**: 157, 1954.
[16] Editorial—*Anaesthesia*, **10**: 3, 1955.

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# CURRENT MEDICAL LITERATURE

### Preservation of Cornea by Dehydration

MCNAIR (*A.M.A. Arch. Ophthalmol.*, **53** : 519, 1955) in a preliminary report observes :

A sucessful method to preserve corneas for transplantation by dehydration is reported.

Corneas completely dehydrated in glycerin can be stored for an indefinite period of time and will yield clear, nonperforating lamellar grafts.

### Carbon Dioxide in the Prevention of Retrolental Fibroplasia

FORTIER (*Am. J. Ophthal.*, **38** : 342, 1954) writes that exposure to a high concentration of oxygen is now considered to be the biggest single factor in the aetiology of retrolental fibroplasia. Since the vasomotor development in premature infants depends on local vascular stimulation rather than on central control from the medulla, the vasoconstrictive effects of high concentrations of oxygen may be explained by their direct effect on local vessels through disturbance of the equilibrium between oxygen and carbon dioxide in the plasma, the high oxygen level resulting in a relative carbon dioxide deficit. The author therefore makes a plea for the use of lower oxygen concentrations in the treatment of premature infants, and for the addition of a non-toxic proportion of carbon dioxide in an effort to eliminate the vasoconstrictive effects of oxygen.

### Oxygen Weaning in Retrolental Fibroplasia

BEDROSSIAN AND OTHERS (*A.M.A. Arch. Ophthalmol.*, **53** : 514, 1955) give in the following lines the summary of their observations :

A group of premature infants who were suddenly removed from an atmosphere of 50 per cent oxygen had a significantly higher incidence of retinopathy of prematurity than did another group of premature infants who had a gradual reduction in the concentration of their oxygen environment. Infants with a progressive retinopathy were given oxygen therapy, with a definite beneficial effect.

The vasodilatation and neovascularization associated with a retinal haemorrhage near the end of a developing retinal blood vessel are also described.

Three possible mechanisms by which the disease may develop are suggested.

Although retinopathy of prematurity is primarily an anoxic disease the direct effect of oxygen is an important factor in its development. Therefore, the administration of supplemental oxygen to premature infants should be limited to the minimum amounts necessary. A 40 per cent concentration inside the incubator is probably the level which should not be exceeded as a routine measure.

The commonest precipitating factor in the disease is the improper withdrawal of supplemental oxygen. Therefore, if an infant is given supplemental oxygen, a gradual reduction in the oxygen concentration of the infant's environment should be made before oxygen is stopped completely.

Oxygen therapy is of value after retinopathy develops if judiciously used and gradually withdrawn.

### Effect of Retrolental Fibroplasia

KRAUSE (*A. M. A. Arch. Ophthalmol.*, **53** : 522, 1955) gives in the following lines the summary of his observation on the effect of retrolental fibroplasia in children :

Of 107 children from 4 to 17 years of age with retrolental fibroplasia who were followed until the present time, 72 attended some kind of school, 16 were at home, 17 were in a state institution for retarded children, and 9 had died. The mentality was considered good in 71( poor in 20, and very low in 16 children. Physical or neurological defects were present in 24 children, and low weight or stunted growth was present sometime during life in 33 children.

A healthy infant, although blind, through proper stimulation and environment was commonly capable of becoming a useful blind adult. The factors which retarded the child temporarily were residual damage from birth, congenital defects, and lack of proper stimulation and environment. Some infants who had a good developmental future were lost to institutions because the social conditions there for advancement of the child were not suitable.

### Pain in Poliomyelitis

BENDZ (*Am. J. Dis. Child.*, **88** : 141, 1954) from personal observation of some 200 cases of poliomyelitis with paralysis of the limbs concludes that the pain has both a neuralgic and myalgic origin, and that its source is to be found in those nerve roots—dorsal and ventral—which arise from the affected segments of the spinal cord, the neuralgic element being referable to the dorsal roots and the myalgic to the ventral roots.

Discussing local and general measures for the relief of pain the author first refers to methods of producing hyperaemia—for example, by hot baths or packs. Friction heat by massage or the reactive hyperaemia which develops after a limb has been deprived of its blood supply for a few moments by means of an inflatable cuff will also alleviate the pain; the latter method has been found to influence painful muscle contractures of the limbs due to "muscle spasm", especially in children. As soon as pain is relieved the arm or leg can be straightened or the foot-drop corrected. Vasodilators such as "benzasoline" (tolazoline) in fairly large doses have been used, but the side-effects are often worse than the pain itself, and the analgesic results are uncertain. Subcutaneous injection of a local analgesic where the pain is maximal is of benefit, particularly in the case of pain in the lumbar region and pain in circumscribed areas. The author has found caffeine, alone or combined with phenacetin, the most effective treatment.

### Piperazine in Ascaris Infection

BROWN (*J. Pediat.*, **45** : 418, 1955) describes the results of administration of this drug by mouth for 2 to 8 consecutive days to 51 infected children. Each child was given 5 ml. twice a day of a syrup containing piperazine citrate (equivalent to 1 g. daily of piperazine

hexahydrate). The child received a normal diet without fasting and no purgative was given.

As a result of the treatment all the roundworms were passed by 46 of the patients, many of the worms being reported to be alive. The percentage reduction in the egg count for the whole group was 95·2. The author considers that failure of treatment was not related to the dosage of piperazine, but rather to the location of the worms in the host, to the presence of certain foodstuffs, or to different absorption rates. A second course of treatment was given to 4 of the children who did not respond to the first and 3 of them were cured. No side-effects were observed.

### Vitamin $B_{12}$ and the Growth of Children

CAMPBELL AND MCLAUGHLAN (*Canadian M. A. J.*, **72**: 259, 1955) write that nine reports on the oral administration of vitamin $B_{12}$ to normal and underweight children and several reports on its use for chronically ill children have been reviewed. The reports are conflicting and demonstrate, above all, a need for critically controlled experiments before any definite conclusions can be reached regarding the possible effect of vitamin $B_{12}$ on growth in children. To date, available evidence indicates that the effect is far from spectacular and that there is little, if any, justification for the widespread use of vitamin $B_{12}$.

### A Fatal Case of Tuberculosis after BCG Vaccination

MEYER (*Am. Rev. Tubere.*, **70**: 402, 1954) reports a fatal case of tuberculosis following BCG vaccination:

The patient, a boy aged 7 years, had had measles, German measles, and whooping-cough, but was well at the time B.C.G. vaccination was carried out. Before vaccination he was tuberculin negative, and there was no evidence of contact with a case of tuberculosis before or after vaccination. A fortnight after vaccination the patient felt ill, and one month later an enlarged lymph node was observed in the left axilla. Generalized enlargement of the lymph nodes gradually developed, accompanied by fever, anaemia, and loss of weight. Nine months after vaccination human-type tubercle bacilli were isolated from the gastric contents, but it was thought possible that the examination was not sufficiently exhaustive. In August, 1951, 14 months after vaccination, tubercle bacilli indistinguishable from organisms composing the vaccine were isolated from pus obtained from a lymph node.

All treatment, including chemotherapy, was ineffective. The lesions consisted in multiple enlarged lymph nodes with abscess formation, and ulceration and infiltration of the skin, chiefly localized to the face, neck, and shoulder region. The urine contained tubercle bacilli. The patient died 2 years and 3 months after vaccination. At necropsy the main findings were generalized enlargement of the lymph nodes, extensive infiltration extending from the lymph nodes and infiltration of the lungs and kidneys. Histological examination of the lungs revealed diffuse amorphous calcium deposits in the connective-tissue stroma; tubercle bacilli were, however, found only in the single cavity present. Microscopical examination of tissue from the lymph nodes showed widespread caseous necrosis, the tissue being densely filled with tubercle bacilli.

### Paradoxical Diarrhoea in Childhood

WILSON AND GUNDRY (*Canad. M. A. J.*, **72**: 362, 1955) write that the presenting symptom in this complex is diarrhoea, although the underlying factor in reality is chronic constipation leading to faecal impaction and resultant overflow of liquid stools. In these circumstances it is the symptom of diarrhoea which is paradoxical.

The aetiology of this disease is similar to that of chronic constipation at any stage. In children the following factors predominate: (1) Inhibition—the sensation of a full rectum if repeatedly ignored or suppressed will diminish the acuity of defaecation reflex; pain of anal fissure will inhibit the reflex. (2) Poor habit formation—inadequate parental supervision contributes to the failure to develop a regular bowel habit. (3) Emotional factors. (4) Dietary factors—insufficient variety or bulk of food or water may contribute to the problem. (5) Hypothyroidism. (6) Mental deficiency.

The general appraisal of a child whose diarrhoea might be of this paradoxical type should then include, besides a physical and neurological examination, consideration of the child's adjustment to his environment and particularly his relations with his mother. The physical examination will help to exclude organic disease of the bowel, for this would be accompanied by malnutrition and abdominal enlargement or distension. In the neurological examination, evidence should be sought for alterations in the reflexes or in the tone of the anal sphincter or for evidence of anaesthesia in the perianal area. Such changes may indicate degenerative disease of the cord or myelodysplasia with spina bifida. The child's attitude, the presence of tremor or moist palms may give evidence of emotional stress. If the child's reactions suggest mental retardation, his intelligence should be estimated by tests suitable to the patient's age.

On inspection of the anal area one may see telltale perianal contamination with greyish stools. The underwear may be similarly soiled. Digital examination will then reveal the rectum to be laden with impacted faeces. This may be confirmed by abdominal palpation of the overloaded colon. However, frequently the scybalous masses are not palpable per abdomen. The tone of the anal sphincter may be poor, but if this persists after adequate treatment, suspicion of some spinal lesion should be aroused.

If there is a typical history and the above-mentioned physical signs and if there are no findings suggestive of true megacolon or neurological disease, a diagnosis of paradoxical diarrhoea can be presumed.

Management of a case consists of the treatment of the predisposing factors:

*The fissure*—Warm potassium permanganate sitz baths will relieve spasm and promote healing. Daily anal massage with a non-sensitizing ointment will lubricate the passage and prevent further injury.

*The impaction*—Children suspected of suffering from paradoxical diarrhoea should usually be hospitalized

where expert nursing care is available to empty the rectum. In younger children, where separation of mother and child is undesirable, this can be done by a visiting nursing service. Rectal evacuation is done by softening the stool with repeated oil injection to be followed by irrigations until the colon is completely emptied. In some cases the initial treatment may require general anaesthesia. Radiographic and other investigations may then be undertaken if they appear to be necessary. Care must be taken to see that all the barium is evacuated afterwards, as retention of this may cause a more serious impaction. Most cases will require the continuation of rectal washing three times weekly for three weeks, twice weekly for two weeks and once weekly for several weeks.

*General care and rehabilitation*—Further treatment consists of the usual management of constipation by the use of a high residue diet, crude vitamin B complex, extra fluids and adequate habit training. Active treatment must be continued until the bowel regains the normal tone and the lost reflex to fullness returns. As children suffering from this condition may have been mistakenly treated for months or years by measures designed to stop diarrhoea and increase constipation, the return of normal bowel tone may be a slow process. Therefore every effort must be directed to the rehabilitation of normal bowel habits. To this end some bulk-forming laxative such as methyl cellulose should be used. At first this may require to be supplemented by cascara. Anal massage will often be helpful to prevent pain and fissuring, but it must be used with caution where there is a great element of fear and emotion, as there is danger of fixing the attention of both mother and child on this painful experience. Finally a most important component of treatment is to ensure a sufficiency of time after the morning meal before leaving for school.

*Psychotherapy*—The underlying psychological factors must be investigated and treated. Search into the environmental emotional factors is usually revealing. Rehabilitation along these lines is just as necessary as direct attention to the bowel itself. Enlightenment of parents regarding the previously mentioned physical and psychological factors in this problem is the role of the paediatrician.

## CURRENT TOPIC

### I.M.A. PRESIDENT'S TOUR IN ASSAM

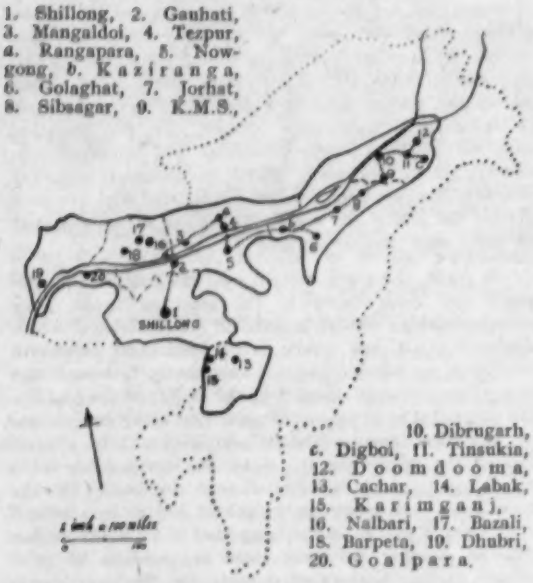
Dr. S. C. Sen, President of the Indian Medical Association, accompanied by Dr. K. C. Borooah and Dr. P. C. Duara, President and Secretary of the I.M.A. State Branch undertook a tour of Assam for a week. Dr. Sen arrival at Gauhati by air on 25-2-55 and was cordially received by the then State Branch President Dr. (Mrs.) T. Raichoudhury and some other members at the aerodrome and they proceeded to Shillong. He graced the State Medical Conference from 25-2-55 to 27-2-55 and had discussions with Shri B. R. Medhi, the Chief Minister of Assam, about the various problems with which the medical profession was confronted.

Immediately after the conclusion of the 6th Assam Provincial Medical Conference, held at Shillong, which Dr. Sen was pleased to open and contribute substantially to its success by guiding the deliberations with his rare ability and experiences, he came down to Gauhati on the 28th afternoon, to begin his Assam tour. The same evening he addressed a meeting of the Gauhati Branch of the I.M.A. and discussed problems relating to the profession and organisation. After a night's rest he began the most strenuous tour covering a distance of nearly one thousand miles of dusty and uneven road, through thick jungles and large rivers. On 1-3-55 his party had to negotiate 120 miles of the dustiest roads of the tour, in a car. But the trouble and hardships of the journey were compensated by the reception and hospitality of the members and colleagues of the three branches they visited. Mongaldoi, Rangapara and Tezpur gave a fitting reception to Dr. Sen and his party. Tea, lunch and dinner parties were arranged according to the time in which these places were reached. Dr. Sen discussed with the local members, difficulties and problems confronting them and made useful suggestions, whenever possible. He appealed to the colleagues, who are still outside the I.M.A., to enroll themselves as members, at an early date and strengthen it.

On 2-3-55, the party crossed over the mighty Brahmaputra and came down to the southern bank. They visited a village cottage hospital at Jakhalabandha which appeared to Dr. Sen a very unique institution well-worth emulation by other villages. The house, furniture and everything had been donated by the people of the locality. He thought it to be an ideal institute, it being an example of self-help amongst the village people. He congratulated the people for it. Next, the party came down to Nowgong, and was entertained to lunch by the members of the Nowgong Branch of I.M.A. in a beautifully erected pandal, in the compound of Srimanta Sankar Mission, another voluntary relief organisation of great repute in the province of Assam. Dr. Sen was shown round its eye relief centre and he talked and discussed with the local members about organisation, Indian Medical Council Act and condition of tea garden doctors. The party halted at Kajiranga, the game sanctuary of the Government of Assam for a night and started for Golaghat next day, where they were received in a tea party by the members of the local branch. Dr. Sen met Dr. Billetti, the President of the B.M.A. (Assam Branch) and discussed with him exhaustively about the service conditions of the tea-garden doctors. Dr. Billetti has been found to be always sympathetic and considerate to his colleagues serving under him and wished a better prospect for them. The same night found the party at Jorhat, where the local doctors greeted and received them in a nicely arranged dinner party. Dr. Sen and Dr. Barooah addressed the gathering. They also discussed with Dr. Savage, the Chief Medical Officer of Jorhat Tea Co. and Secretary B.M.A. (Assam Branch) and Dr. Gilroi of Ross Institute about the conditions of service and status of tea garden doctors. They found Dr. Savage very helpful and sympathetic towards the colleagues, who were under him and reflected the correct attitude a medical man placed in higher position should adopt to-

wards his colleagues in a lower one. They were really charmed by his talks. Next morning, Dr. Gilroi took the party round the Ross Institute at Toklai and explained its activities. Dr. Savage showed them a central hospital under him.

The party left for Sibsagar and Dr. Sen addressed a joint meeting of the local doctors and the public of Sibsagar. The next meeting was at Khowang, where about 20 doctors from neighbouring tea gardens and local board dispensaries and private practitioners collected. Dr. Sen discussed with them the problems of medical men and asked them to enroll themselves as members of the I.M.A.




A Map of Assam. The Numbers Indicate the Branches of I.M.A. and the Hatched Line the Route of the President's Tour.

The same night the students and staff of the Assam Medical College and members of the Dibrugarh branch I.M.A. met Dr. Sen and party in a meeting, which was very well attended. Dr. Sen spoke on World Conference on Medical Education and other subjects of medical interest. The party was entertained to dinner in the Medical College.

On 5-3-55, three meetings were arranged, one at Digboi, one at Tinsukia and the other at Doomdooma. At Digboi, Dr. Sen pleaded for opening a new branch and talked with the local doctors and tried to understand the prospects and conditions of service in the Oil Company. At Tinsukia and Doomdooma, which are predominantly tea-areas, again the question of tea-gardens' doctors formed the main topic of discussion. The question, whether the tea-gardens doctors should enter into a trade union came up for discussion. Both Dr. Sen and Dr. Borooah agreed that they should be advised not to enter into a trade union for the present, but try to carry on negotiation with the I.T.A. through the I.M.A. of which the tea-garden doctors should all be members, about the status, pay, prospect and security of service. They seemed to appreciate the suggestions put forward by Dr. Sen and Dr. Barooah and acted accordingly.

On 6-3-55 Dr. Sen and Dr. Duara visited the Medical College Hospitals and Dr. Sen left for Calcutta *en route* to New Delhi, at noon by plane.

Dr. S. C. Sen on a Visit to the Assam Medical College
Seated (L.—R.) Dr. S. C. Sen, Dr. H. C. Barua (Principal) and Dr. P. C. Duara, with Professors of the College.

The tour was of great value from the point of view of organisation, since it brought the President and the party, in direct contact with over four hundred medical practitioners and gave them an opportunity to know at first hand their difficulties, worries and problems, and placed them in a better position to find out a solution. As regards the tea-garden doctors, the problem when boiled down came to the following few heads :

1. Security of service.
2. Annual grant of leave for 1 month.
3. Study leave and arrangement for refresher courses.
4. Status.
5. Revision of existing pay scale of I.T.A.
6. One day off in a week by arrangement.

Dr. Sen, Dr. Barooah and Dr. Duara agreed on these points and discussed with the Chief Medical Officers, wherever they met them and took the latter's opinion and suggestions which were helpful and sympathetic.

Dr. Sen also desired to discuss these points with the Deputy Director of I.T.A. at Calcutta.

Altogether 13 branches were visited by the party. Everywhere they were received with due respect, cordiality and enthusiasm; the arrangements for their stay were perfect everywhere and left no room for improvement.

The whole tour, as Dr. Barooah said, was an education itself and the branches concerned deserved the party's sincerest thanks and gratefulness.

# NOTES AND NEWS

### Indian Delegation to Geneva Atomic Energy Conference

Mr. H. J. Bhabha, Secretary to the Government of India, Department of Atomic Energy, and Chairman of the Indian Atomic Energy Commission is leading the Indian delegation to the International Conference on the Peaceful Uses of Atomic Energy, scheduled to be held in Geneva from August 8 to 20.

Other delegates to the Conference are Dr. K. S. Krishnan, member, Indian Atomic Energy Commission and Director, National Physical Laboratory of India; Dr. V. R. Khanolkar, Director, Indian Cancer Research Centre and Chairman, Biological and Medical Advisory Committee, Department of Atomic Energy; Mr. Arthur S. Lall, Permanent Representative of India at the United Nations, and Dr. D. N. Wadia, Geological Adviser, Department of Atomic Energy. The delegation will have 14 members.

### Soviet Assistance in Atomic Research in India

The Prime Minister Shri Nehru told the Lok Sabha on July 25 that some Indian scientists engaged in atomic research would soon visit the Soviet Union to discuss the Soviet offer of assistance in atomic research in India.

He told the House that India was in close touch with about a dozen nations including U.S.A., U.K., U.S.S.R., France, Canada, Norway, Israel and Egypt for co-operation and collaboration in atomic research and has formal agreements with some of them. The assistance received was in the nature of facilities for training of Indian personnel, supply of literature, technical know-how of processes, procurement of specialised equipment etc. and supply of fuel elements for reactors.

### Health Education Scheme for Villages

The Government of Uttar Pradesh are proposing to launch their experiment of rural health education in the five districts of Lucknow, Basti, Almora, Jhansi and Meerut shortly. Villagers will be taught the rules of health through film strips and slides as well as printed literature, lectures and exhibitions. Health educators will tour the countryside extensively to break the antipathy and ignorance of people against such useful measures as inoculations and vaccinations against epidemics. It is known people do not avail of these facilities through prejudice.

A central health film library will also be established at Lucknow for providing plentiful supply of imported and indigenous films.

It is ultimately proposed to extend health education throughout the state.

### War against Leprosy

An anti-leprosy pilot project, subsidized by the Centre, is shortly to be started for the eastern districts of Uttar Pradesh with headquarters at Banaras. Intensive treatment methods, including sulphone therapy, on a mass scale and detailed information about the nature of injection and its prevention will form the new features of the drive to control leprosy.

Attempt will be made to create an atmosphere of sympathy between the healthy and infected people while the tendency to conceal disease will be eliminated or reduced.

### Madras Medical Council

Information was received by the Madras Medical Council that Dr. Oommen published his name with the qualification in the advertisement under the heading 'Learn Homoeopathy' in the issue of *Hindu*, dated 13th February and 27th March 1954. As the action of Dr. Oommen in allowing his name to be included in the advertisement is against the Code of Medical Ethics, the Madras Medical Council held an enquiry on 29th March 1955 and found him guilty of infamous conduct in a professional respect. In exercise of the powers conferred on it by section 16 (2) of the Madras Medical Registration Act, 1914, the Madras Medical Council directed that the name of Dr. Oommen, Chochandy, L.M. & S. (Madras), 1917 holder of Registration Certificate No. 1580, dated 1st November 1917, be erased permanently.

### World Congress of Medical Practitioners for the Study of Present-day Living Conditions

A Congress of medical practitioners, representing thirty countries, was held in Vienna during May 23-25, 1953, with the object of studying present-day living conditions, and the report of the Congress has now been published. The report begins with the opening address of the honorary president, Prof. E. Stransky, emeritus professor of neuropsychiatry in the University of Vienna, who accepted the honorary presidency on condition that its proceedings should be non-political; but he was compelled by ill-health to hand over the direction of the Congress to the president, Prof. P. Verga, director of the Institute of Anatomy and Pathological Histology of Naples, and director of the Cancer Research Institute in that city.

The main part of the report is divided into three parts: Part I is devoted to forty-two addresses given on living conditions in various countries; Part 2 includes the twenty-two addresses given on various aspects of the effects of the Second World War on the physical and mental health of the peoples of a wide variety of countries; and Part 3, which deals with the duties of doctors faced by the problems raised, consists of sixteen addresses on these problems and discussions of them. All these addresses are given in English, French, German and Russian.

### The American Association of Anatomists Honours Indian Doctor

The American Association of Anatomists, at their 68th Session held in Philadelphia recently, have elected Prof. S. K. Bose of the Nilratan Sircar Medical College, Calcutta, as one of its members.

### Award of the Raptakos Medical Research Board Fellowships

The Raptakos Medical Research Board will consider applications for the award of fellowships for research work on medical and allied subjects in recognized institutions situated in the Union of India. The awards normally consist of Rs. 3,000/- per year for a Fellowship and Rs. 750/- per year towards special equipment or chemicals approved by the Board, and may be renewed on the basis of satisfactory progress.

Applications in the prescribed form, which may be obtained from the Secretary and Treasurer, should be forwarded through the Guides, under whom research work will be carried out, and the Heads of the Institutions. Applicants should have an M.B., B.S., or M.Sc. degree or its equivalent or not less than two years' experience in research work after B.Sc.

Applications for grants for the year commencing January 1, 1956 should reach the Secretary and Treasurer, Raptakos Medical Research Board, Dr. Annie Besant Road, Worli, Bombay 18, before September 30, 1955. Further information also may be had from him.

## CORRESPONDENCE

*The Editor is not responsible for the views expressed by correspondents.*

### The Future of Pharmaceutical Industry in India

SIR,—In the June 1 issue of your Journal, both the editorial on the Pharmaceutical Enquiry Committee's Report and the special article by Dr. S. P. De have quite rightly condemned the continued existence of ill-equipped "mushroom firms which have done incalculable harm to the fair name of the Indian pharmaceutical industry". "The sooner they go out of existence the better for the country", but how? It is difficult to understand how an All-India Pharmaceutical Manufacturers' Association could eliminate many of the undesirables from the trade "by enforcing rigid regulations for membership and setting up a code of ethics", as suggested by Dr. De. The present deplorable situation is largely due to the absence of any drug control machinery in some of the States and to its laxity in some other States where it formally exists. This has been recognized by the Pharmaceutical Enquiry Committee, which has recommended the centralization of the Drugs Control Administration. The Government will be rendering an invaluable service to the industry as well as to the public by a more uniform and vigorous enforcement of the Drugs Act in all the States of the Union.

Pending such action by the Government which is bound to take a long time, is it too much to expect some discrimination on the part of the physician? How can the "mushroom concerns" flourish, if the physicians do not patronize their products? Caught in between the established foreign laboratories on the one hand and the price-cutting "mushroom concerns" on the other, the ethical manufacturers in India are getting a raw deal. Yet, they are blamed for not showing sufficient enterprise and not spending enough on research work.

If the critics of the industry would take the trouble to investigate the business turnover and the expenses of the long-established laboratories in India, they would be surprised to find that few of these laboratories are able to put aside yearly any substantial sum of money as Reserve Fund for sustaining a spirit of enterprise or to undertake research work even on a modest scale. Yet, it should be admitted that research work of a sort is not entirely lacking in the industrial laboratories.

The future of the Indian pharmaceutical industry could be much brighter if only the Indian medical profession sheds its prejudices against the products of even a few Indian laboratories, reliable enough to serve some of their requirements, and the Government tightens the drugs control administration, besides revising its import trade policy. I am etc.

Bombay. G. B. RAMASARMA.

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We fully agree that a rigid and tight Drug Control Administration can effectively check the activities of the mushroom firms. In the meantime we suggest the manufacturers could take a lead in the matter by setting up an All-India (Manufacturers) Council of Pharmacy and Chemistry, affiliation to which would be extended only to the ethical manufacturers. This council should maintain a well equipped and properly staffed standardization and control laboratory and should be authorized to put a "seal of approval" on all accepted preparations, somewhat on the lines of the American Medical Association's seal of acceptance. Simultaneously, there should be extensive propaganda by the council to the medical profession to only accept preparations bearing the seal of approval. This will to a large extent help the profession to choose the right thing and thus eliminate the products of the undesirable manufacturers, and create confidence in the medical profession for Indian preparations.—ED., *J. Indian M. A.*

### Primary Units for Medical Relief Organisation in a State

SIR,—It is of utmost importance that in the second Five Year Plan top priority should be given to medical relief to the masses. Both curative and preventive measures should be energetically enforced so that the standard of health of the nation be raised and be thus favourably compared with that of other progressive nations of the world.

A paper scheme already exists but unfortunately no notice of it is being taken. The Health Survey and Development Committee under the chairmanship of Sir Joseph Bhore, K.C.S.I., issued a report in two volumes. The Report reveals the hopeless state of medical relief all over the country, the low standard of medical relief given to the masses, the unhygienic conditions prevailing all over the country specially in the rural areas and the prevalence of preventable epidemic and endemic diseases.

One important omission by the Committee was the organisation of transport (of a patient). It was very cursorily treated. The transport of a patient from a distant village to a dispensary or hospital is of utmost

importance. The different modes of transport, road, railway, waterway should have been fully considered. It is not easy and practical to multiply hospitals as they require medical and nursing staff, organisation and uptodate equipment but a hospital can be made accessible through an efficient transport to all the rural areas within its jurisdiction. The transport should be adequate and reliable. Any plan of medical relief without a transport will be unsuccessful. The remotest village should therefore be connected with the quickest possible transport with the hospital.

An immediate start should be made to survey a political constituency and to execute a plan for medical relief of the same. For even the remotest villages, roads, available transport and lines of communication should be determined and explored. Contact should be established with various social workers under the Social Welfare Scheme and the problems of medical relief, maternity and child welfare, sanitation and town planning be carefully studied.

1. A first aid medical box consisting of medicines etc. for minor ailments should be given to a village or group of villages. It should be given in charge of a school master or any educated person of the locality. This experiment was tried in various villages of the Allahabad District and was greatly appreciated. The keen volunteers should be given a short course of instruction in first aid, sanitation and the women should be trained as 'dais'. The local men and women so trained will solve the difficulties of finding trained personnel to settle down in the villages. The villages will thus be provided with medicines for their minor ailments in their own locality.

2. Mobile dispensaries fitted with medicines and surgical appliances and dressing should be provided in addition. This will also connect the villages with the nearby dispensary besides treating medical and surgical cases in their daily rounds. It should be in charge of a medical officer. This mobile unit will be akin to a first aid station of a field medical unit and under the charge of a M.O.

3. Dispensary—A medical dispensary will have to play a large and important part in giving medical relief to the rural areas. It is akin to a main dressing station of a field medical unit. It is a connecting link between the villages under it and the main hospital. It will be a hospital in miniature—the staff, organisation, equipment and in-patient beds being the same as those of a hospital. No attempt should be made to minimise its importance.

A motor ambulance must be provided to transport a sick patient from a village to the dispensary and from the dispensary to the hospital when considered necessary.

Constituencies thus surveyed comprehensively and approximate cost both recurring and non-recurring being ascertained, a working nucleus is established. In the light of the experiences gained, other districts of the state should be rapidly surveyed; special attention to be paid to local conditions and environments.

We are fortunate to have soon the second Five Year Plan so that it should not be difficult to have enough money for this purpose having supreme national importance. It would be a proud day in the history of medical relief in the State when a villager from the remotest corner of the State is removed in the shortest time to a dispensary or a hospital and get the best medical treatment. I am etc.

28, Kutchery Road, Allahabad.

(MAJOR) S. N. KAUL,
*President*,
The Allahabad Medical Association.

### Oligochaetes in Tube Well Water

SIR,—The West Bengal Public Health Laboratory examines more than three thousand samples of drinking water per year of which about 15 per cent are derived from tube wells. Searching our records for the last ten years we find that we have not encountered any worms in the tube well waters. However, on two occasions during 1953 samples of tube well water were received by this laboratory containing oligochaetes.

On the first occasion it was on the 28th May 1953 that a sample of water containing a few worms of about 9 mm. in length was sent to us by Messrs. Jessop and Company, Calcutta. This water is reported to have been collected from a tap in a pipe connected to an overhead tank fed solely by a deep tube well. It was reported also that the overhead tank was cleansed and disinfected a few days earlier.

On the second occasion on 13th July, 1953, a sample of water containing a big worm about 200 mm. long was sent to this laboratory by an Assistant Director of the West Bengal Public Health Directorate. The worm is stated to have come out while pumping out water from a 124 ft. deep tube well in Jawgram in Pandua, Dist. Hooghly.

The first worm was identified as an oligochaete belonging to the family Naididae and genus Nais. This worm which is aquatic in nature and is fairly distributed in fresh waters throughout India is described fully by Stephenson in his "Fauna of British India" (1923).

The other worm was identified as an aquatic oligochaete belonging to the genus Limnodrilus under family Tubificidae. As some portions of the worm were damaged during examination, species diagnosis was not possible. The specimen however was interesting on account of the during examination, species diagnosis was possible. The specimen however was interesting on account of the fact that only 8 species belonging to 6 genera have been so far found in India.

In places where there are formations of chalk, limestone and sandstone which are liable to fissures extending to great depths and opening at surface, contamination of deep well is possible. But in a place like Gangetic West Bengal, where there are no such formations the only important source that can be thought of, is polluted water used for priming purposes. Worms contained in such polluted water when they enter the tube well water may remain there living for some time on account of the aquatic nature of the worm. It is also possible however for eggs of worms entering the well through

some leakage or through percolation from water channels feeding the well and comfortably developing into adult worms inside the tube well.

My thanks are due to Sri M. N. Datta of the Zoological Survey of India, for his kind help in the identification of the worms. I am etc.

West Bengal Public Health Laboratory, Calcutta. RADHAKRISHNA BANERJEE.

REFERENCE

STEPHENSON, J.—Fauna of British India, Volume Oligochaetes, 1923, p. 53.

## REVIEWS

**Clinical Bacteriology**—By R. Joan Stokes. Pp. vii+288. Publishers: Edward Arnold (Publishers) Ltd., London.

Today, the clinicians have at their disposal the services of laboratories to help them in the diagnosis of cases. Although in India laboratory services have not developed as in the Western countries, the trend in the urban areas encourages us to believe that in near future there will be much expansion in this field. Naturally good reference books on clinical bacteriology and laboratory practice will be in demand, as it is also now by those engaged in laboratories. Dr. Joan Stokes' book is a fresh addition to the already existing list of such books. For those who are working in the East and the tropics the book will be a valuable one as the chapter on identification of bacteria gives practical hints on the isolation of the salmonellas and coliform group, and that on investigation of fungous infections will be of great help for those interested in such studies. In the age of antibiotics, screening of antibiotics in clinical practice is being appreciated and as such the pages devoted to antibacterial drugs will be a welcome treat for those who need information in this subject. The book also deals on methods of preparation of media and other matters which will go a long way to solve the problems of the clinical pathologists. We could recommend this book not only to those working in laboratories, but also to the senior medical students and the practitioners who, in our opinion, would find it a great help in clinical practice.

**Medical Parasitology**—By N. C. Dey, Professor of Pathology and Bacteriology, Assam Medical College. Pp. 166, Distributors: U. N. Dhar & Sons Ltd., Calcutta.

A book dealing exclusively in medical parasitology including protozoology, helminthology and entomology will be a help to students of Tropical Medicine. The book gives useful information on the subject, is well illustrated, and written in concise form to help students preparing for examinations. In the Appendix 1 and 2 details of laboratory techniques for examination of blood and stool are given, these will prove valuable for those interested in clinical laboratory practice. A good book for students.

## OBITUARY

### Lt.-Col. Khan Bahadur Ahmed Baksh, O.B.E., I.S.O.

Lt. Colonel Khan Bahadur Dr. Ahmed Baksh, O.B.E., I.S.O., a distinguished member of the Indian Medical Association, died on the 10th June 1955 at the age of 75, at his residence in Ushaganj, Indore.

Born on 20th April, 1880, he passed the Hospital Assistant Diploma final examination in 1901 and entered service as Hospital Assistant in the Central India Agency Cadre the same year being posted to the Bundelkhand Agency Hospital, Nowgong. He was liked by the public as well as by the Ruling Chiefs, Political Agents and Agency Surgeons. While in Nowgong, the titles of "Khan Sahib" and "Khan Bahadur" were conferred on him by the British Government. It was also from here that he passed the L.C.P. & S. examination of the College of Physicians and Surgeons of Bombay. In

DR. AHMED BAKSH

the year 1918 he was transferred to Indore King Edward Hospital and Medical School and put in charge of the Surgical Department. In 1923 he was appointed Assistant Residency Surgeon, Indore, and Superintendent, Central India Agency, Indore, which post he held for about ten years. During this period "I.S.O." was conferred on him. He retired from the Central India Agency Medical Department service in the year 1933-34 and then joined the Bhopal Government Medical Department as Surgeon in charge of the Bhopal Main Hospital where he was the recepient of "O.B.E." The rank of Lt. Colonel was also given to him by the Bhopal Government. He held the post of Director of Medical and Health Services, Bhopal Government, for some time. During the first and second great wars he held the post of Agency Surgeon in Bundelkhand, Nowgong.

Dr. Ahmed Baksh had all along been leading an active life and rendering professional help to all those needing it irrespective of caste, creed and social status.

# SUPPLEMENT
# Journal of the Indian Medical Association

Vol. 25, No. 6 CALCUTTA August 16, 1955


## VI ASSAM MEDICAL CONFERENCE SHILLONG

The sixth Assam Medical Conference was held at Shillong with Dr. K. C. Borooah as president from 25th to 28th February, 1955 under the auspices of the Assam State Branch of the I.M.A. About 250 members from all over Assam gathered to attend the conference. The reception, accommodation, catering, entertainment and all other arrangements for such a big congregation received the careful attention of the Reception Committee.

Major S. M. Gupta, the Chairman of the Reception Committee.

The State Council of I.M.A. met on the 25th evening and 26th morning. Dr. S. C. Sen, president, I.M.A. participated in the deliberations of these meetings and offered his valuable suggestions on many points.

On the 26th afternoon Shri B. R. Medhi, the Chief Minister, inaugurated the Conference. Education Minister Shri O. K. Das, Health Minister Shri R. N. Brahma, Dr. S. C. Sen and all past presidents of the Assam Medical Conferences graced the occasion.

The Opening Address of Dr. S. C. Sen, the I.M.A., president, high-lighted many health problems facing the country in general and the medical profession in particular.

The Health Exhibition was opened in the morning by the Health Minister Shri R. N. Brahma. Besides Pharmaceutical, Surgical and Food products, the main attractions of the Exhibition were centred in the Stalls of Detection of Spurious drugs.

The scientific session which was largely attended was inaugurated by Mr. L. M. Banerji, the veteran surgeon.

The Souvenir Volume which was published on this occasion was in itself truly symbolic of this memorable event.

On the 28th February, delegates were taken round to visit different health institutions. The administrative unit of the Military Hospital and the day to day work of other institutions, particularly of the Pasteur Institute, the Reid Chest Hospital and the Welsh Mission Hospital were highly appreciated by the visitors.

In the inaugural address Shri B. R. Medhi, the Chief Minister of Assam stressed on the importance of making the people health conscious. He said "Sound health is an indispensable asset to the nation for working with full vigour to usher in a welfare state and for speeding up economic and social progress of the country". He requested the young doctors to devote at least first few years of their professional life in the rural areas where about 90% of the population are living. Further he requested the medical men to help the Government to eradicate the spurious drugs and adulterated food.

Dr. K. C. Barooah, the President of the Conference.

Major S. M. Gupta, the chairman of the Reception Committee accorded a hearty welcome to the delegates and guests. In his speech he fully reviewed the position of health and medical facilities available in the State. He referred to the first Five Year Plan in which Assam's share under medical was only Rs. 173·5 lacs. This amount, in his opinion for a State like Assam which is

somewhat undeveloped but extensive was absolutely inadequate.

Dr. K. C. Borooah the president of the Conference in course to his address said :

### Rural Medical Relief

The rural medical relief of Assam, do not appear to be different from what has been for a decade or so. Although the primitive methods of preparation of vital statistics bring statistical consideration of health conditions in Assam to a very slippery ground and to make confusion worse confounded, the Ministry of Public Health has not come out with any annual report since 1951—it cannot be denied that they have not shown any improvement. Malaria, Tuberculosis, Hookworm and other diseases are taking their usual toll of lives. Child mortality is not showing any appreciable change. Cruel Nature with its devastating floods and erosions, has added to the cup of misery of our people. The first Five-Year Plan of the Government gave us a ray of hope and quite naturally, everybody thought it might be the beginning of something the rural medical relief eagerly looked for; but it vanished into the thin air. The plan itself is urban in its outlook. The recommendation of the planning commission that the greatest emphasis should be on rural health and development of primary units, was never kept in view.

Leaving aside the plan, the working of it, as seen in Government's published reports, does not show any encouraging achievement. Out of 176·59 lacs earmarked for the medical department only 90·60 lacs have been spent upto March 1954. Still more miserly attitude is visible on the public health side. Out of a revised budget of 10·12 lacs only 2·43 lacs have been spent. It is doubtful whether they will be able to spend the rest of the amount by March 1956. It is amazing to find a Government complaining of paucity of funds, failing to utilise whatever little sum it has got for such a nation-building work. Whatever the reasons might be for not spending this meagre amount, one is constrained to think that it shows lack of imagination and boldness in planning. Economically poor Assam can ill afford to lose opportunities like these.

It is a matter of regret that inspite of its unstinted support and active co-operation with the Government, in all matters concerning relief measures in flood and devastations of earthquake, the I.M.A., Assam State Branch, was never taken into confidence or consultation in preparing the first five-year plan. I sincerely hope this mistake will not be repeated in their second five-year plan. The working committee of the I.M.A., Assam State Branch, have submitted a very sensible plan to the Government of Assam for consideration and adoption in their second five-year plan. It is fairly comprehensive, since it includes and refers to all the aspects of medical relief in our State. It envisages 680 primary and 68 secondary rural health centres, 22 subdivisional and 11 district centres, with provisions for fighting special diseases, e.g. tuberculosis, kala-azar, leprosy, hookworm, malaria, etc., besides maintaining and expanding the Medical College, the mental hospital at Tezpur, the Pasteur Institute and maternity and child-welfare centres. The whole scheme shall involve a non-recurring expenditure of three crores and a recurring expenditure of two crores. Of these, the first three crores should come from the Centre and the annual recurring expenditure of two crores, being about 10% of the State's total resources, could not be considered too heavy a burden on its finances for such an important work.

Assam, with a population of about 92 lacs, has about 3,000 registered doctors, i.e. 1 doctor to 3,000 people, which is not a bad figure. Of these one thousand are in the tea gardens, about five hundred may be in the villages and the rest one thousand and five hundred are crowded in the towns of Assam. With an urban population of 4,14,418, roughly four lacs, this works out as one doctor to 265 men. While half of the available medical men are in the towns catering for five per cent of the total population, the other half remains to serve 95% of it, in the rural areas. This clearly shows a maldistribution of medical men, which is the main factor in the apparent shortage of doctors for the country-side. What is true for Assam is equally true for the other States of India. The blame for such a condition should not be put absolutely on the medical profession. The administrators are equally, if not more, responsible for such an unhappy state of affairs, since they have not made uptil now any serious attempt to wean away the willing doctors from the urban areas by any imaginative and sympathetic plan and attract them to the villages. The latest attempt of the Assam Government to meet this demand for doctors, by creation of Class I junior Assistant Surgeon, is not a move in the right direction. It carries with it the seed of its own failure. Besides creating an unnecessary and invidious class distinction, it will fail to give sufficient incentive for work, for a pittance of Rs. 175/-. Better service and living conditions should be the dominant features in any plan designed to be attractive.

There is also a dangerous tendency among the administrators to tackle the problem of rural medical relief by producing a set of medical men like vaids, homoeopaths and village aid-men undergoing a very short course of 2 or 3 years' study of a questionable type of medicine, a hotchpotch of Ayurveda and modern scientific medicine. Probably they do not put the values of lives of our villagers at par with those of our brethren living in urban area.

### Ayurveda

Recital of history of the glorious past of Ayurveda with pride has become a stock-in-trade of many a medical men and politician of today delivering addresses in medical conferences. I concede, Ayurveda might have served the people thousand of years back, but it has remained dumb and static for centuries when science marched past by it. The idea of reviving Ayurveda, which is beyond resuscitation, is fantastic and is fraught with unnecessary waste of intelligence, men and money. I sincerely feel, the establishment of Ayurvedic colleges in some of the States is not the right method to glorify it.

### Homoeopathy

Regarding homoeopathy, eminent scientists like Lauder Brunton and A. J. Clark, have considered its simili-similibus and dilution theories absurd and unscientific. Our President Dr. S. C. Sen who has a wide experience about medical practices in different parts of the world has spoken clearly about homoeopathy. Banished from its land of birth it is today taking shelter in the medically undeveloped areas of the world and as such India is its happy hunting ground.

### Medical Education

It may be doubted whether medical education is a pertinent topic for a conference like this. It may also be argued that this question be better left to the educational pundits of medical science. While conceding to them the privilege to go into the details of its academic questions, we claim to have the right to make broad suggestions for its change and improvement in the light of our practical experiences. In recent times no branch of the technical sciences has been subjected to so much scrutiny and discussion in its educational aspect as the science of medicine. Conflicting views have been expressed by experts who are entitled to an opinion. I believe medical education must be directed to meet the specific medical and health needs of the country in which it is imparted. It should not aim at a blind imitation of those of the other countries, seeking for an uniformity, which is neither possible nor desirable. The first

world conference for medical education held in London in August 1953 observed that "while the basic background and preparation of the students for admission to the study of medicine has a fairly common denominator, the methods, technique and actual needs in medical training itself vary greatly, depending upon the objectives being sought in various parts of the world to meet the specific medical and health needs of the different areas." In my opinion, that is exactly what it ought to be. In India the recognition and approbation by the British Medical Council was, and is still, the bug-bear of our policy makers, shaping the destiny of its medical education. The ghost of the British Medical Council is still hovering in their minds exerting unnecessary influences. The question of reciprocity of recognition is another factor impeding the formulation of a bold and independent policy of medical education in India which is long overdue. I doubt very much whether other countries in the world look to the British Medical Council for an inspiration as much as our country does.

If it is conceded that medicine today has emerged out of its narrow rut of curative occupation and has assumed a newer outlook mainly of a preventive science with a definite purpose of serving men, then it must take cognition of the fact that man is a social being, a creature of his education, environment, climate of the country he dwells, his culture and his economic status—and hence varies, in response to the variation of these factors. As a corollary to that medical needs of India cannot be the same as those of the other countries. Since medical education is a means to an end, it must naturally be different too.

I hope I shall not be accused of impertinence, if I venture to suggest that the curriculum of the medical colleges can be easily curtailed and overhauled, as opined by the Bhore Committee and be made to fit in within a course of four years. I do not claim it to be a novel or revolutionary suggestion. If United States and Japan can have a four years course for producing medical graduates, I do not see any reason why we in India who have better grounds cannot do it. The pre-medical education should of course cover a period of three or four years of collegiate teaching, comprising not only of basic sciences like Physics, Chemistry and Biology, but should also include humanities like literature, logic and psychology. The minimum age for admission into the medical colleges should not be less than twenty years.

### Assam Medical College

This being the only institution of our State for the production of its much needed personnel for its health-services, it must naturally draw our attention and its working be subjected to closest scrutiny. The members of the I.M.A. must show an enlightened and intelligent interest in it and forward constructive suggestions to its authorities whenever they feel to do so. By common consent, it stands as the finest achievement of the Government of Assam, after the attainment of our independence and as such, they can justly be proud of it. I had the opportunity to see this beautiful institution growing from a mere dream of Late Gopinath Bordoloi and Dr. Bhubaneswar Borooah, into an imposing affair, humming with life and activity and is decidedly a fine monument of their constructive ability and vision. Dr. Borooah's anxiety to see it as one of the best medical colleges of India, not only in equipment and management, but also in production can only be seen how its thought consumes him day and night. Connected with it from its very inception, he has now made it the main mission of the remaining days of his life. It is pleasing to note that this institution is growing day by day and its recognition by the Indian Medical Council within such a short period is a glowing tribute to its creditable performance.

The composition of the governing body of such an important institution, as it stands, leaves much room for improvement. It is a technical institution and certainly demands a separate pattern of composition from that of a village panchayat or the executive committee of a political party. In my humble opinion, it should be formed by experienced teachers of medicine, prominent medical men, scientists and outstanding public men and psychologists. The method of selection of students seeking admission to the college is primitive. While it is engaging the attention of the best brains of other countries, and the question is widely discussed and reviewed from its various angles, we here in Assam are sticking to a system reminiscent of the old British regime, when seats were allotted on the basis of tribes and communities living in the State. Healing art does not recognise any barrier of caste or creed and never takes into account any tribe, clan or community. The cream of our boys and girls, endowed with intelligence, love of service, scientific outlook, tenacity of purpose, fortitude should have entry into this temple of learning. Political or communal consideration should never be allowed to come in.

### Indian Medical Council Act and the Licentiates

Let me now turn to the question of the medical licentiates 'the orphans of the storm of medical politics'. The Indian Medical Council Act of 1933 which has denied the inclusion of the licentiates into the all-India medical register is completely antinational, inhuman and unjust. This act should be amended without any more delay.

This black act of 1933, which stands unamended, as a monument of injustice to the two-third of medical men in our country, and at the teeth of opposition of the entire profession, even after seven years of our attainment of independence, is a poor commentary on the efficiency and sense of justice of the authority responsible for its continuance. I sincerely hope and request our leaders of I.M.A. to give this question the topmost priority and fight it out successfully with all the seriousness and tact that such a subject of gravity demands.

### Integration of Services

If health means complete physical, mental and social well-being and not merely the absence of disease and infirmity, and if the concept of a modern doctor is not only a healer of diseases but person directing his activities to prevent them, so that life becomes enjoyable, the classification of doctors into two old groups of public health and medical is absolutely outdated and outmoded. The question of integration of health services has been engaging the attention of the Government of Assam since 1927, but unfortunately it took quarter of a century to come to a decision. Even after a decision have been made, the integration is only at the highest and not at the lower levels. The recent advertisement in the papers for the post of the Director of Health Services reflects the indecisive mood of our Government. I hope the Government takes a clear decision on it and bring about a complete integration of these two wings of our health services in all its levels.

### Unitary Cadre of Services

Different patterns of education have produced a sort of caste system in the medical services of our country. The old classification of Civil Surgeon, Assistant Surgeon I and Assistant Surgeon II and the recent Assistant Surgeon I junior should be revised in the light of modern set-up of things. The idea of creation of this new class is an enigma to me. Now that all the medical schools have been upgraded, the production of medical licentiates has ceased in the country, and those who are already in the service must have by this time to their credit at least ten or more years of practical experience in medicine, which, in all fairness to them, entitles them to be treated on an equal footing with the new graduates.

If the Government recognises this, a big step in the direction of removal of an unnecessary class distinction and unification of services, shall be taken. The Government of Madras have already shown a progressive mind in this direction and I hope the Government of Assam will give the lead in this matter by reorganising the State services on a unitary and equitable basis.

### Medical Certificates

In United Kingdom and other advanced countries of the world a registered doctor has certain advantages and privileges and obligations. They can issue death and birth certificates, passports and sickness certificates. But his counterpart registered in India does not possess all these. The authority in India can refuse to accept service given by a qualified registered practitioner without showing any reason. What is more curious that an officer of any Government institution can issue a certificate which will be held valid but not the certificate of another who is not fortunate enough to be a Government man. This is certainly a very anomalous position. The privileges of the registered doctor are more in theory than in practice. I hope the registered practitioners' rights and privileges are clearly defined and the anomaly cleared up at an early date.

### Duties and Taxes on Medicine

Medicine is an essential requirement of life. Taxation on essential and vital requirements cannot be justified by any canon of justice and a welfare State should not throw an extra burden on the poor ailing people and must refrain from deriving a revenue at their cost.

In response to a resolution passed in the last Tezpur session of our conference, a deputation on behalf of the I.M.A. State Branch, waited on the Chief Minister of Assam, who unfortunately could not entertain the idea of removal of taxes on medicine, but assured the members to see that quinine and quinine products are exempted from it. Since quinine is now-a-days more or less replaced by newer and better synthetic antimalarial drugs, this assurance, I am really sorry to say, amounts to no relief at all. I hope he will revise his decision and lift the existing sales tax on medicine.

### Family Planning

Assam has got the lowest birth rate in India. If the statistics given in the public health report of Assam Government can be relied upon, one should seriously consider the introduction of Family Planning in our State. The birthrate per mille is only about 14 compared to 34 in Bombay, 30 in Punjab, 27 in Madras, 20 in Bengal, 20 in U.P. I believe, a proper survey is a crying necessity, since, besides the medical problem of family planning, it will throw a light on many knotty questions related to population of Assam, including reservation of land proportionate to the growth of its indigenous population, distribution of land and formulation of a land policy, which has given a headache to many and has made the Government of Assam a target of attack by interested outsiders.

### Urban and Rural Water Supply and Sanitation

Since majority of the diseases in the rural and urban areas are ascribed to bad water supply and lack of sanitary arrangement we should pay more attention to them. Government of India have rightly realised their importance and have made provisions to the extent of 60 crores for schemes of rural water supply; and out of this 22·7 crores have already been allotted to States for schemes they have formulated. Rajkumari Amrit Kaur, Union Health Minister, appeals to the State Governments who have not taken advantage of this central provision for rural water supply and sanitation to send up their schemes expeditiously. Besides this another 12 crores have already been sanctioned to the states for urban water supply and sanitation for schemes sent up by the States. I hope Assam is not one of those states who have failed to send up their schemes and take advantage of this laudable move of the Central Government.

### Tuberculosis

Although no dependable statistics of the incidence of tuberculosis in Assam is available, there is no denying of the fact that it is increasing, and creating a serious problem to us all. Though intelligent consciousness of this disease amongst the educated section of our people is steadily increasing, yet an incredible amount of ignorance is still woefully prevailing among the illiterate masses. Knowledge about the cardinal signs and symptoms of this disease, its cause and mode of infection and the methods of its prevention and treatment should be carried home to every man of the State by film shows, lectures, pamphlets and other usual methods of propaganda.

In the absence of any other known agent for the prevention of tuberculosis, our experts have recommended the use of B.C.G. vaccine. The Government of India and the State Governments with the help of U.N.I.C.E.F. and W.H.O., have launched a mass vaccination campaign and have already inoculated millions of children and adults. It is claimed, that B.C.G. vaccine has reached the final stage of acceptance. To me it seems to be only an experiment which will require at least half a century to have a verdict. In the meantime, the other usual measures of its prevention, including improved standard of living and sanitation should not be lost sight of. The FIT programme, i.e. finding, isolating and treating the tubercular patients should be vigorously pursued. To this end, establishment of T.B. hospitals, clinics and sanitoria and after-care colonies, are to be taken in right earnestness by the State Government. The B.C.G. vaccination campaign should proceed on along with it, but should not be thought to be the last word on the prevention of tuberculosis and certainly not meant to replace the other known measures for it.

### Malaria

The lop-sided interest shown by the Ministry of Health in Assam, in controlling this disease, makes one to think, that in spite of 60 per cent of mortality in this State credited to Malaria, it is probably not considered to be a serious problem. While other States of India are taking full advantage of the National Malaria Control Scheme of the Government of India, which it has inaugurated in April, 1953, and will be completing the operational phase within a year, Assam has not even started it. Enlightened public opinion demands not only an explanation, but an immediate starting of this bold nation-wide venture to control a scourge like Malaria, which is responsible for so much misery, suffering and economic loss of our people.

### Hookworm

Colleagues, who have been constantly in touch with the rural population of Assam cannot but be struck by the high incidence of infection of this worm. It gives rise to protean symptoms and insidiously undermines the health of its victim, and thus paves the way for other diseases. At least 40 per cent of our rural population harbours this worm in their intestines. If the most modest 20 per cent of incidence be taken for an estimation of economic loss, with a sum of rupees thirty per annum per capita, the total loss comes to about six crores annually, which could easily be saved by a vigorous programme costing three crores or even less. Since it is a social and environmental disease, much can be done

by propaganda lectures about the mode of infection and the improvement of environmental hygiene and sanitation. I am really glad to note the Government of Assam is realising the menace of this disease and a campaign though inadequate is already afoot against it. There is also a rising consciousness about this disease among the rural population. These are happy signs, and I hope the campaign is pushed with a greater vigour.

### Leprosy

The number of leprosy cases in Assam seems to be gradually increasing. At present there are nine leprosy institutions in Assam of which four are State managed, three by the Missionaries, one by Mikir Seva Kendra and one by the Local Board. Besides these there are 39 public health leprosy clinics spread all over the Province. Recently Assam Seva Samity and Srimanta Sankar Mission are coming to the field and we expect notable work from them. About 1709 leprosy cases have been treated in all centres.

We should spread the available knowledge of its transmission and prevention, to the masses and the Government should open out more leprosy centres.

### Maternity and Child Welfare

When 20 per cent of our population is composed of children, naturally it becomes the concern of the medical men to look after their health and well-being. Maternal and infant mortality rate in Assam is very difficult to assess. The public health report of 1951 gives a maternal mortality figure of 1,214 due to child birth in that year and an infant mortality rate of 170·65 per mile. These are no small numbers. One out of every twenty-three infants, dies in the first year of its life. The existing maternal and child welfare centres are inadequate. There should be many more centres and these should preferably be located in rural areas. Lectures and demonstrations by films about natal, antenatal and postnatal cares should be arranged and encouraged. Meetings of our women afford us special opportunities for this and should always be taken advantage of.

Periodical medical examination of school children should be made compulsory in all schools. The I.M.A. Assam State Branch submitted a scheme to the Government to this effect, but nothing has yet been done about it. I hope the Government take up the matter as early as possible and we assure them our unstinted support.

### Nursing Profession

In modern times nursing of the sick has become a science as well as an art. It has developed along with the improvement of the hospitals.

India's demand for nurses is great. While England has one nurse for every 300 persons, India has only one for every 34,000 people. Training of nurses should be taken up more vigorously by the Government, than they are at present doing. Every available institution, where such facilities exist, must have one centre and every district hospital can easily afford this. A right type of women should be drawn to the profession. Men should also have a share in this beautiful occupation. This would solve the problems of the scarcity of nurses and also the educated unemployment.

### Mental Hospital and Mental Health

There is an alarming increase in the number of lunatics and mental delinquents in our State today. The unbearable strain of modern civilisation, ravages of the cruel war, conflict of ideas and changing values of life, impact of foreign thoughts and ways of living, defective education, poverty are some of the major causes for this high casuality of mental diseases. Our educationists and the leaders of medicine on this particular line, must find out some means to stop it. To call the hospital of lunatics at Tezpur a mental hospital is definitely a misnomer. It is a prison for the unfortunate victims of psychic trauma and should be raised from that unhappy state to a full-fledged psychiatric hospital.

Prof. Mayer Gross has been lent to India by the World Health Organisation as a consultant. Mysore Government has already taken advantage of him to develop the Bangalore centre. The Government of Assam should also take the help of this expert and improve the Tezpur centre and bring it to the level of other well-equipped modern psychiatric hospitals of India.

It is really pleasing to note that the Government of India have realised the urgency and importance of developing a properly organised mental service for our country. Rajkumari Amrit Kaur in her opening speech in the conference of mental health workers in Ranke (Behar) expressed a hope that the coming years will see a concerted effort on the part of the central and State Governments to make up the present deficiencies.

### Assistant Medical Officers in the Tea Gardens

The Indian Medical Association took up the case of the Assistant Medical Officers in the tea gardens and a sub-committee was formed to go into the matter. This sub-committee has submitted its report, in which it has suggested a basic salary of Rs. 200—25—500, with a special allowance of 50% of basic pay, a dearness allowance according to the existing rules together with a non-practising allowance of 25% of basic pay. It includes also facilities for provident fund, bonus and gratuity with demands to place them in the same rank with the officers of the tea estate.

The I.M.A. should take up this case with the proper authorities of the tea estates, in the highest level and the recommendations which are considerate, should be implemented without delay.

### Srimanta Sankar Mission

I feel I shall be failing in duty if I do not mention about this infant voluntary organisation, which is doing laudable relief work amongst our poor people. Its eye-relief centres are drawing appreciation from all.

### Drug Store

The State of Assam has 307 hospitals and dispensaries under the direct control of the Government and the medical requirements of these institutions amount to nearly Rs. 8 lacs annually, which it at present obtains from the Government Medical Stores, Calcutta. This system of procurement of drugs from that store is proving costlier to our State Government. It has to pay approximately 30% more than the usual cost. Besides this there are other disadvantages in this arrangement, such as chronic delay in execution of orders, failure of supply, loss due to breakage, etc. Occasional dislocation of communication makes things worse. Establishment of a Central Drug Store at Gauhati is the obvious solution. This will not only change the spasmodic nature of supply, into a sustained and continuous one, but will also involve a lesser cost.

### Conclusion

In conclusion, I appeal to my colleagues to enrol themselves as members of the Indian Medical Association and make it the most representative body of our profession and one of the most powerful medical organisations of the world, so that we may be proud of it, not

for the futile vanity of its bigness in size, but for its strength of action and service, born of unity and purpose.

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*Resolutions passed at the Conference:*

1. This Assam Medical Conference records its deep sense of sorrow on the sudden and untimely demise of our President Dr. J. C. Das and the following members of the medical profession and conveys its heartfelt condolence to the members of the bereaved family.

(1) Dr. D. N. Banerjee, Calcutta.

(2) Dr. P. R. Barooah, Palashbari.

(3) Dr. A. Kakati, Dibrugarh.

(4) Dr. C. C. Mitra, Dibrugarh.

2. This Conference strongly urges upon the State Government to consider the Health Scheme submitted by the Association in preparing the second Five Year plan for the welfare of the State.

3. As in the opinion of this Conference the present classification of the Assam Medical Service into Civil Surgeon, Asstt. Surgeon (I), senior and junior and Asstt. Surgeon (II) is not only unnecessary and redundant in the present set-up but also detrimental to the interest of service since it creates an invidious class distinction and fails to give proper incentive for work, this Conference urges on the Govt. of Assam to immediately abolish the present designations and reorganise the medical services on a unitary basis to be known as the 'Assam Medical Service' and the doctors be designated as Medical Officers and all of them be ranked as Gazetted Officer—whether graduate or licentiate.

It is further proposed that there may be classifications as Senior, Junior, District Medical Officer etc. according to the nature of duties, and the minimum starting pay of all medical officers be at least Rs. 200/- P.M.

4. Resolved that the Government be moved to keep open all future recruitment in the medical and the Public Health Departments to the registered medical practitioners, whether graduate or licentiate, on equal terms; condonation of age be made in case of suitable and deserving candidates.

5. Resolved that the Sales Tax on medicine and medical accessories be abolished as it affects mostly the poor public and any such tax on goods used for preservation of health is only inconsistent with our professed idea of a welfare state.

6. Resolved that the Government be moved to arrange for sanitary arrangements in all the bus stands in the interest of hygiene and sanitation.

7. This Conference views with great concern the enormous increase in quack practice, resulting in indiscriminate use of drugs and tremendous increase in sale of spurious drugs and resolved that the Government be urged upon for enacting suitable legislation to stop:

(1) Practice of medicine by unqualified and unregistered persons.

(2) Sale of spurious drugs, and making such offences cognisable.

8. This Conference offers the services of the members of the Association for periodical examination of health of the school children on suitable terms.

9. In view of the resolution passed in the All-India Conference held at Lucknow this Conference is of opinion that the Ayurvedic College at Gauhati be abolished forthwith and a research wing on Ayurvedic medicine be instituted in the Assam Medical College.

10. Resolved that the library of the Pasteur Institute be enlarged with a view to establish a Central library particularly for reference books and these be made available to all the registered medical practitioners.

## BRANCH NOTES

**JAMSHEDPUR BRANCH**—A meeting of the branch was held on 11-5-55. The members condoled the sad death of Dr. B. Bose, one of the founder members of the branch. Dr. S. Sen of Tata Main Hospital spoke on "Polyomyelitis."

**KISHANGANJ BRANCH**—A meeting of the branch was held on 29-4-55. Ten members were present. The letter of the All India Chemists and Druggists Federation regarding Ciba's malicious propaganda on post card depicting Indian life and customs was discussed.

**KOTALPUR BRANCH**—A meeting of the branch was held on 26-4-55, with Dr. M. N. Mal in the chair. The routine business was transacted.

**MADURA BRANCH**—A meeting of the branch was held on 30-4-55 with Dr. T. S. Ranga Iyengar in the chair. Eighty-five members were present. Dr. C. R. R. Pillai of Stanley Hospital spoke on "Pericarditis".

**MANDYA BRANCH**—A meeting of the branch was held on 29-4-55 with Dr. Samasastry in the chair. Dr. H. Samasastry was elected the president in place of Dr. B. Subbaramiah transferred to Mysore.

**MONGHYR BRANCH**—On 21-11-54 an ordinary meeting was held under the presidentship of Dr. S. N. Sen. 34 members attended. Proposed constitution of the local branch upto No. 17 was adopted with modification.

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On 19-12-54 an ordinary meeting was held under the presidentship of Dr. S. N. Sen. 29 members attended. Besides routine business an article on Vesical Calculus was read by Dr. B. B. Bose (Luckeesarai) with particular reference to (1) methods of diagnosis, (2) choice of operation, (3) modification of standard operation and its relative advantage, (4) Etiology.

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On 23-1-55 an ordinary meeting was held under the presidentship of Dr. S. N. Sen. 32 members attended. Proposed constitution of the local branch from 18 to 25 was adopted with modification. It was decided to celebrate the Health Week at Monghyr from 18 to 24th February 1955 and a subcommittee was formed for the purpose. A programme was also chalked out in the meeting.

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On 10-2-55 an ordinary meeting was held under the presidentship of Dr. D. N. Roy. 31 members attended. Besides routine business the house sanctioned a sum of Rs. 80/- for the celebration of Health Week.

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On 16-3-55 an ordinary meeting was held under the presidentship of Dr. D. N. Roy. 33 members attended. The association observed the day as foundation day in a befitting manner. A physical feats demonstration was arranged at 6 P.M. at the residence of Dr. B. Datta, Fort Monghyr. At 8 P.M. the members met at the residence of Dr. D. K. Dutta where several members spoke on the growth and development of the association. Later the members were entertained with a nice dinner by Dr. D. K. Dutta.

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On 22-3-55 an emergent meeting was held under the presidentship of Dr. S. N. Sen. 32 members attended. The members emphatically protested against the proposed imposition of professional tax by the Monghyr Municipality.

**MORVI BRANCH**—A meeting of the branch was held to give a hearty send off to Dr. Miss K. M. Patel on the eve of her transfer to Porbander. Dr. J. G. Parekh presided.

**MUZAFFARNAGAR BRANCH**—A meeting of the branch was held on 17-4-55 with Dr. Vishnu Datt in the chair. Dr. Vishnu Datt read a paper on Blood Pressure.

**NIZAMABAD BRANCH**—A meeting of the I.M.A. branch, Nizamabad was held on 29th May 1955 at Civil Hospital with Dr. L. R. Deshpande, Civil Surgeon in chair. Dr. K. V. Subramanyam, Medical Officer, Bodhan, spoke on "Minor Maladies and their treatment."

**SHILLONG BRANCH**—A meeting of the branch was held on 14-5-55. Mrs. K. V. Nimbkar of Bombay spoke on the importance of Rehabilitation in Medicine. Thirty members were present.

**SHIMOGA BRANCH**—A meeting of the branch was held on 7 May 1955. Dr. Charles D'souza of Krishnarajendra Hospital, Mysore spoke on Nephritis.

**TIRUCHY BRANCH**—A meeting of the branch was held on 23-4-55 with Dr. N. C. Subramanyam in the chair. Forty members were present. Dr. K. Vasudevan, Civil Asst. Surgeon, Government Headquarters Hospital, Tiruchu gave a talk on Burns.

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A meeting of the branch was held on 7-5-55 with Dr. N. C. Subramanyam in the chair. Dr. V. V. S. Krishnamurthy was thanked for his donation of Rs. 700/- towards the construction of a wing on the western side of the Mathuram hall, to be named after his father late Sri V. V. S. Iyer. Dr. V. Hariharin of B.C.G. Vaccination campaign, Madras, spoke on B.C.G. campaign.

## XXXII ALL INDIA MEDICAL CONFERENCE, JAIPUR

The city of Jaipur is to be the venue of the 32nd All India Medical Conference to be held in the last week of December, 1955. This annual conference is attended by about one thousand and five hundred delegates and distinguished visitors from all over India. Such an occasion should be utilised by those who are associated with the development and progress in the modern system of Medicine by participating in the following activities of the Conference.

1. *Souvenior*: To commemorate the occasion a Souvenir will be published. This is a unique opportunity of advertising products of interest to medical practitioners. The Souvenir shall have its circulation throughout the country, about 3000 (Three thousand) copies are expected to be published. The size of the Souvenior will be 10" × 7".

*Charges for advertisement insertion shall be—*

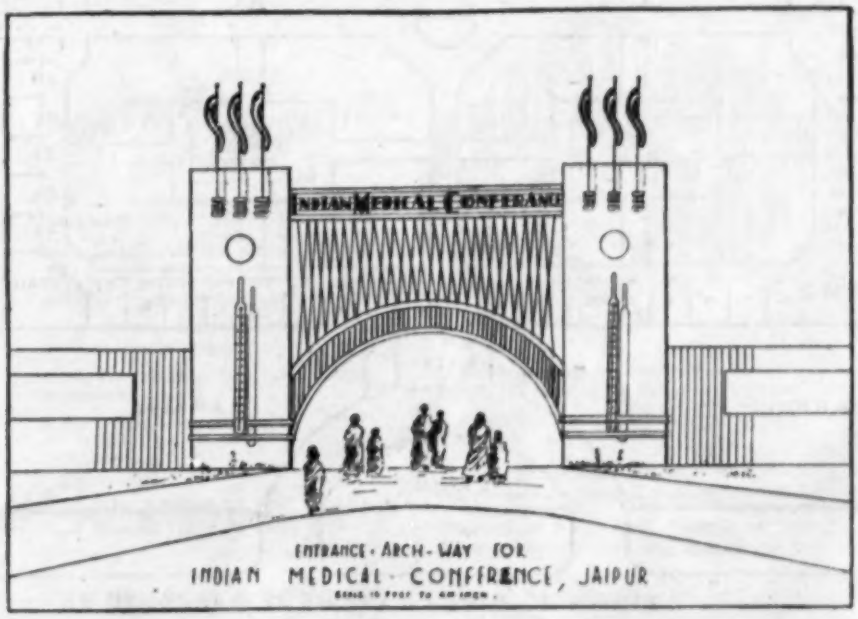
| | |
|---|---|
| Second cover (Inside title page) full page ... | Rs. 450/- |
| Third cover (full page) ... ... | Rs. 400/- |
| Last cover (back) full page ... ... | Rs. 450/- |
| Ordinary full page ... ... ... | Rs. 175/- |
| „ half page ... ... ... | Rs. 90/- |
| „ quarter page ... ... | Rs. 55/- |

Space for advertisement shall be reserved strictly in order of priority.

2. *Exhibition*: A Scientific exhibition depicting the advancement in the various phases of modern medicine shall also be organised. This exhibition is open to all pharmaceutical concerns, dealing in surgical instruments, hospital equipment, X-ray appliances, microscopes etc. and those making models and scientific charts. Models depicting sanitary installations of scientific interest can also be given a suitable place in this exhibition. Various State Governments have been also requested to send exhibits of scientific value and importance.

The plan of the exhibition is published herewith. Rates of the stall are as follows:

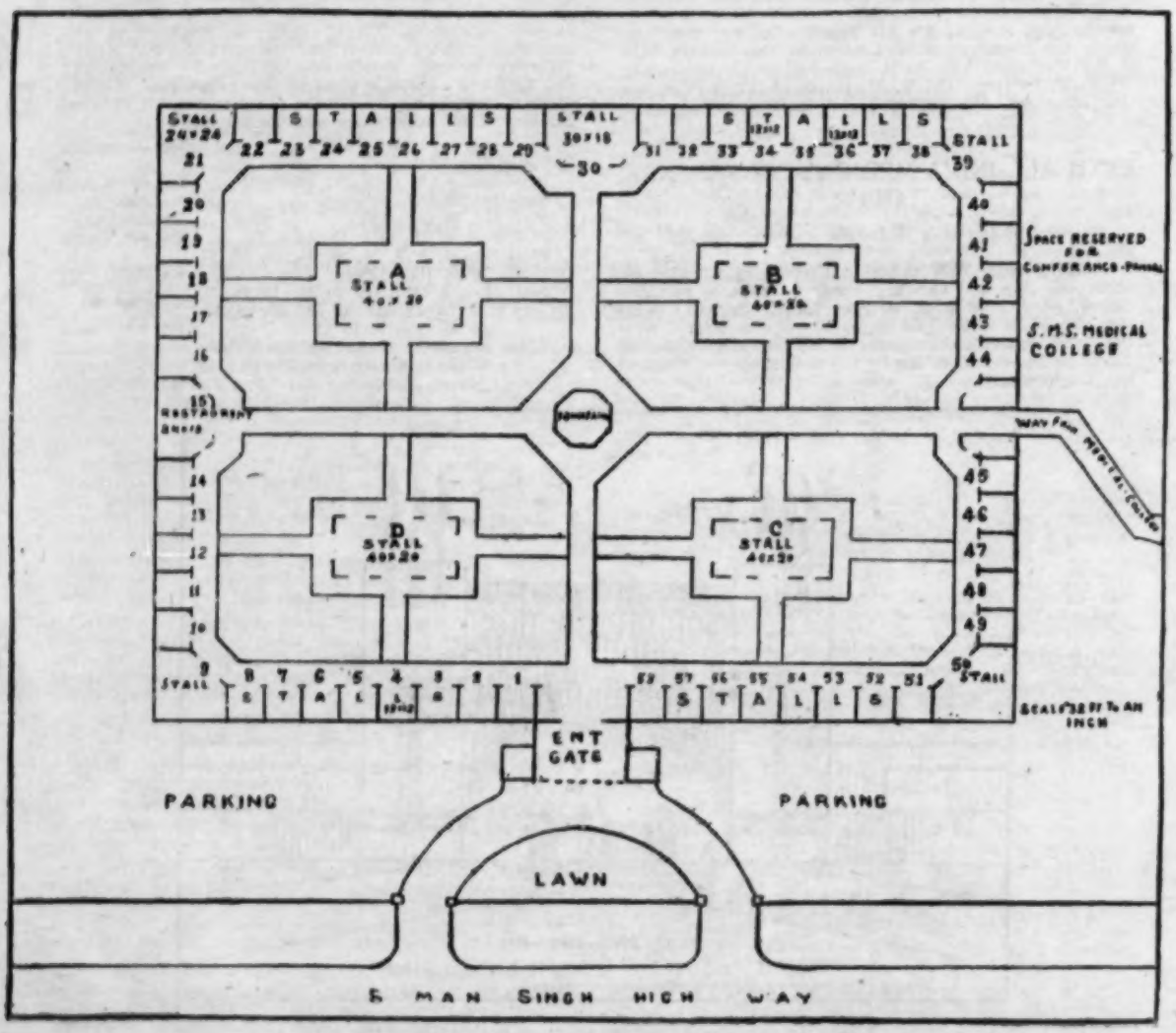
| | |
|---|---|
| Pavilions A, B, C & D (40' × 20') ... | Rs. 600/- each |
| Stall No. 30 (30' × 18') ... ... | Rs. 500/- |
| Stall No. 15 (24' × 18') ... ... | Rs. 500/- |
| Stall Nos. 9, 21, 39 & 50 (24' × 24') ... | Rs. 300/- each |
| Stall Nos. 1, 2, 3, 28, 29, 31, 32, 56, 57 & 58 (12' × 12') ... ... | Rs. 350/- each |
| Stall Nos. 4 to 8, 10 to 14, 16 to 20, 22 to 27, 33 to 38, 40 to 44, 45 to 49 & 51 to 55 ... ... | Rs. 200/- each |
| Space for advertisement on either sides of the gate one each side (Rs. 15 per sq. foot) ... ... | Rs. 200/- each |




There is space for Advertisements on both sides of the gate.

### TERMS

1. Space for advertisement and reservation of stalls shall be strictly in order of priority.
2. Rent of the stalls and advertisements charges shall be payable in advance. Remittances can be made either by M.O. or crossed cheques addressed to the Organising Secretary, 32nd All India Medical Conference, Jaipur.
3. A special concession of 15 per cent shall be given for advertisement in the Souvenir to those who take a stall in the Exhibition.
4. A specified number of light points (from 2 to 4 according to the size of the stall) shall be given. Additional lighting arrangements shall have to be undertaken by firms concerned at their own cost through approved contractors, but no extra charges for the electricity consumed shall be made.
5. Decorations and furnishing of the stalls shall be made by the stall holders at their own cost.
6. If desired, boarding and lodging shall be provided to the stall holders in the delegates' camp at the charges which the delegates attending the conference shall be paying.
7. Facilities shall be provided to stall holders for taking furniture on rent at reasonable rates current at Jaipur.
8. All communications shall be addressed to Dr. B. N. Consul, Organising Secretary, 32nd All India Medical Conference, Jaipur.
9. While applying for reservation for a stall in the exhibition or advertisement in the Souvenir it will be advisable if the applicant's choice is mentioned as Nos. 1, 2 or 3 etc. so that in case his choice for No. 1 or 2 is already booked it may be possible to book the next choice without further correspondence.



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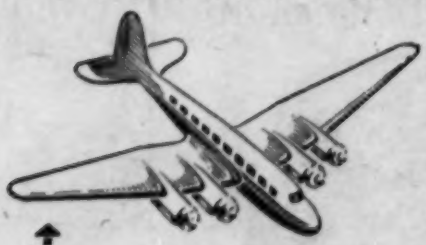

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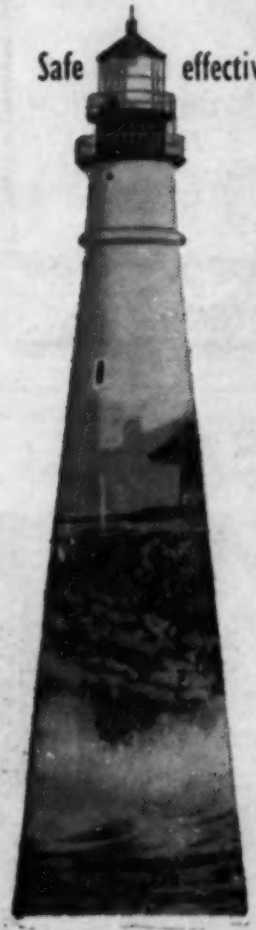

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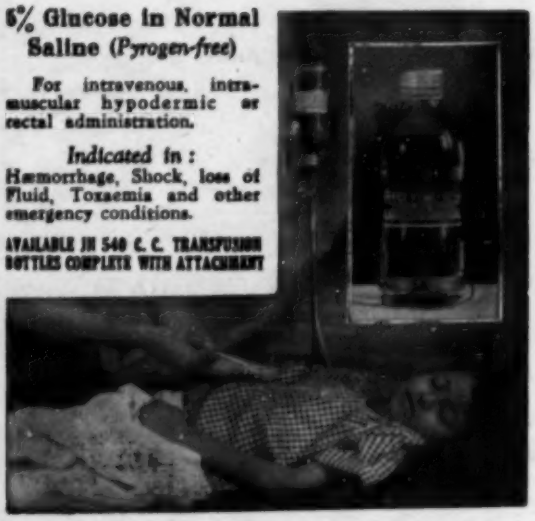

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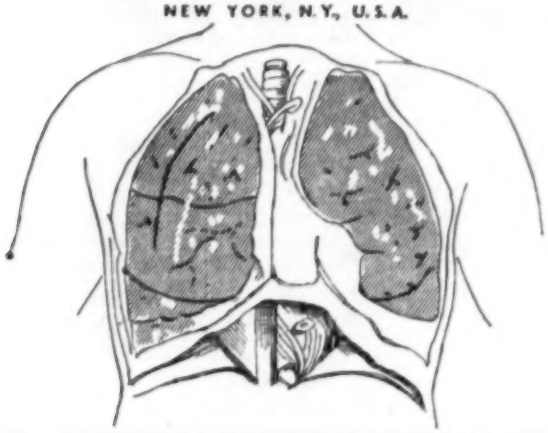

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